

***SYSTEMS INTEGRATION  
PROGRAM***

---

***COMPETITIVE  
ANALYSIS***

**INPUT LIBRARY**

## ABOUT INPUT

---

Since 1974, information technology (IT) users and vendors throughout the world have relied on INPUT for data, objective analysis, and insightful opinions to support their plans, market assessments and technology directions particularly in computer software and services. Clients make informed decisions more quickly and save on the cost of internal research by using INPUT's services.

Call us today to learn how your company can use INPUT's knowledge and experience to grow and profit in the revolutionary IT world of the 1990s.

## ANNUAL SUBSCRIPTION PROGRAMS

---

### ***NORTH AMERICAN AND EUROPEAN MARKET ANALYSIS***

*Analysis of Information Services, Software and Systems Maintenance Markets  
5-year Forecasts, Competitive and Trend Analysis*

- 15 Vertical Markets
- 9 Categories of Software and Services
- 7 Cross-Industry Markets
- The Worldwide Market (30 countries)

#### **— U.S. —**

- Outsourcing
- Client/Server
- Systems Integration
- IT Vendor Analysis
- EDI / Electronic Commerce
- U.S. Federal Government IT Procurements

#### **— EUROPEAN —**

- Outsourcing
- Systems Integration
- Customer Services

## CUSTOM CONSULTING

---

Many vendors leverage INPUT's proprietary data and industry knowledge by contracting for custom consulting projects to address questions about their specific market strategies, new product/service ideas, customer satisfaction levels, competitive positions and merger/acquisition options.

INPUT advises users on a variety of IT planning and implementation issues. Clients retain INPUT to assess the effectiveness of outsourcing their IT operations, assist in the vendor selection process and in contract negotiation/implementation. INPUT has also evaluated users' plans for systems and applications downsizing.

## INPUT WORLDWIDE

---

**San Francisco**—1881 Landings Drive  
Mountain View, CA 94043-0848  
Tel. (415) 961-3300 Fax (415) 961-3966

**New York**—400 Frank W. Burr Blvd.  
Teaneck, NJ 07666  
Tel. (201) 801-0050 Fax (201) 801-0441

**Washington, D.C.**—1953 Gallows Rd., Ste. 560  
Vienna, VA 22182  
Tel. (703) 847-6870 Fax (703) 847-6872

**London**—17 Hill Street  
London W1X 7FB, England  
Tel. +71 493-9335 Fax +71 629-0179

**Paris**—24, avenue du Recteur Poincaré  
75016 Paris, France  
Tel. +1 46 47 65 65 Fax +1 46 47 69 50

**Frankfurt**—Sudetenstrasse 9  
D-35428 Langgöns-Niederkleen, Germany  
Tel. +6447-7229 Fax +6447-7327

**Tokyo**—Saida Building, 4-6, Kanda Sakuma-cho  
Chiyoda-ku, Tokyo 101, Japan  
Tel. +3 3864-0531 Fax +3 3864-4114

J U L Y     1 9 9 3

---

# U.S. SYSTEMS INTEGRATION COMPETITIVE ANALYSIS

**INPUT®**

---

San Francisco • New York • Washington D.C. • London • Paris • Frankfurt • Tokyo

Published by  
INPUT  
1953 Gallows Road, Suite 560  
Vienna, VA 22182-3934  
U.S.A.

**Systems Integration Program**  
(SIP)

***U.S. Systems Integration Competitive Analysis***

Copyright © 1993 by INPUT. All rights reserved.  
Printed in the United States of America.

No part of this publication may be reproduced or distributed in any form, or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

The information provided in this report shall be used only by the employees of and within the current corporate structure of INPUT's clients, and will not be disclosed to any other organization or person including parent, subsidiary, or affiliated organization without prior written consent of INPUT.

INPUT exercises its best efforts in preparation of the information provided in this report and believes the information contained herein to be accurate. However, INPUT shall have no liability for any loss or expense that may result from incompleteness or inaccuracy of the information provided.



## Abstract

# INPUT LIBRARY

This report focuses on the vendors in the systems integration (SI) market in the U.S., based on a combination of 1991 and 1992 revenues and organizational structures. Systems integration has emerged from the professional services segment of the information services industry to become a major delivery mode for products and services.

This report is based in part on a definition of SI that emphasizes the integrator's role in providing overall management of the contract, serving as the single point of contact and having responsibility for the business function, project performance, scheduling, cost, and responsibility for final delivery of a complete system. Growth has been significantly slowed in this industry segment by recession and buyer demand for faster results and consequently smaller projects. Factors such as downsizing, re-engineering, network integration, and communications have nonetheless kept it in the leading growth position in the information services industry.

This report provides a comparative analysis of the structure, business objectives, organization, financial characteristics, strategies, market focus, and capabilities of the leading SI vendors. It also discusses the emerging role of secondary SI vendors.

This report also provides descriptions of individual SI vendors, with INPUT assessments of their industry position and direction. Based on vendor surveys and independent INPUT research and analysis, trends and shifts in strategy that are occurring in this market are identified, wherever possible. Conclusions are drawn about the likely evolution of the market over the next five years.

It was prepared as part of INPUT's Systems Integration Program, which includes other reports and provides clients with a host of market research services.



# Table of Contents

---

<b>I</b>	<b>Introduction</b>	<b>I-1</b>
	A. Objectives	I-2
	B. Scope and Methodology	I-3
	1. Scope	I-3
	2. Methodology	I-4
	C. Report Structure	I-8
	D. Related INPUT Reports	I-8

---

<b>II</b>	<b>Executive Overview</b>	<b>II-1</b>
	A. Background	II-1
	B. Trends and Issues	II-2
	1. Market Overview	II-2
	2. Buyer/User Issues	II-6
	3. Vendor Issues	II-7
	C. Primary Findings	II-9
	1. Competitive Structure	II-9
	2. Secondary SI Vendors	II-11
	D. Conclusions and Recommendations	II-13

---

<b>III</b>	<b>Competitive Structure</b>	<b>III-1</b>
	A. Market Overview	III-2
	1. General Characteristics	III-2
	2. Federal versus Commercial Market	III-3
	B. Market Factors and Projections	III-8
	1. Federal versus Commercial Projections	III-8
	2. Key Commercial Factors	III-10
	3. Key Federal Factors	III-11

## Table of Contents (Continued)

### III

C. Buyer Issues/Vendor Challenges	III-13
1. Buyer Issues	III-13
2. Vendor Challenges	III-15

### IV

#### Vendor Profiles

AT&T	1/91
American Management Systems (AMS)	1/90
Ameritech Information Systems (AIS)	12/91
Andersen Consulting	12/92
BDM International, Inc.	12/92
Boeing Computer Services	1/90
Bull HN Information Systems, Inc.	2/91
Cincinnati Bell Information Services (CBIS)	2/92
Computer Sciences Corporation	7/93
Computer Task Group (CTG)	7/92
Control Data Corporation (CDC)	12/91
Coopers & Lybrand	2/91
Digital Equipment Corporation (DEC)	2/91
Electronic Data Systems (EDS)	8/90
Grumman Data Systems	7/93
GTE	7/92
Hughes Aircraft Company	7/92
International Business Machines (IBM)	2/91
KPMG Peat Marwick	1/91
Litton Corporation	7/92
Lockheed	12/92
Martin Marietta	12/92
McDonnell Douglas Systems Integration Company	1/90
NCR	1/91
NYNEX Information Solutions Group	8/90
PRC, Inc.	1/91
Price Waterhouse	2/91
Science Applications International Corporation (SAIC)	12/92
SHL Systemhouse (SHL)	8/90
STM Systems Corporation	1/91
Technology Solutions Company (TSC)	2/92
TRW	12/92
Unisys Corporation	12/92

## V

## Comparative Analysis

V-1

- A. Organization and Resource Allocation V-3
  - 1. Organizational Structure V-3
  - 2. Allocation of Resources V-5
- B. Financial Characteristics V-6
  - 1. Leading Competitors' Revenues and Revenue Sources V-6
  - 2. SI Profitability Factors V-8
  - 3. Project Composition V-10
- C. Capabilities and Products V-11
  - 1. Overall Capabilities and Skills V-11
  - 2. Product Offerings/Technologies V-14
  - 3. Secondary SI Vendors V-15
- D. Strategies and Markets V-17
  - 1. Market Selection Criteria V-17
  - 2. Market Focus V-20
  - 3. Advertising and Promotion V-21
  - 4. Vendor Marketing Alliances V-22

## Appendix

## A. Systems Integration Profile Questionnaire

A-1

# Exhibits

## I

- |    |  |     |
|----|--|-----|
| -1 | Information Services Industry Structure—1992 | I-2 |
| -2 | Report Objectives                            | I-3 |
| -3 | Primary Information Sources                  | I-4 |
| -4 | Secondary Information Sources                | I-5 |
| -5 | Interview Subject Areas                      | I-6 |
| -6 | 1992 Vendor Survey Participants by Class     | I-7 |

## II

- |     |   |       |
|-----|---|-------|
| -1  | U.S. SI Market Forecast—1992-1997                             | II-3  |
| -2  | SI Vendor Capability Definition                               | II-3  |
| -3  | Systems Integration Market Forecast—Commercial versus Federal | II-5  |
| -4  | Major Buyer/User Issues                                       | II-6  |
| -5  | Major Vendor Issues   | II-8  |
| -6  | U.S. Systems Integration Vendor Market Share, 1991            | II-9  |
| -7  | U.S. Commercial Systems Integration Vendor Market Share, 1991 | II-10 |
| -8  | U.S. Federal Systems Integration Vendor Market Share, 1991    | II-11 |
| -9  | Secondary SI Vendors  | II-12 |
| -10 | Recommendations   | II-13 |

## III

- |     |   |        |
|-----|---|--------|
| -1  | U.S. IS/SI Market Forecast, 1992-1997                                       | III-3  |
| -2  | Civilian versus DoD Expenditures for Federal Systems Integration, 1992-1997 | III-4  |
| -3  | Commercial versus Federal Systems Integration Characteristics               | III-5  |
| -4  | Products/Services In Systems Integration Programs                           | III-6  |
| -5  | Commercial versus Federal Project Composition (1992)                        | III-7  |
| -6  | Market Sectors By Projected Growth, 1992-1997                               | III-9  |
| -7  | Key Commercial SI Market Factors  | III-10 |
| -8  | Key Federal SI Market Factors   | III-12 |
| -9  | Major Buyer/User Issues   | III-13 |
| -10 | Technology Importance Rating—Manufacturing Industry                         | III-14 |
| -11 | Vendor Challenges—Prospecting and Selling                                   | III-15 |

# Exhibits (Continued)

## IV

### Vendor Profiles

#### ATT

- 1 AT&T Business Functions Centralized or Decentralized 3
- 2 Distribution of SI Personnel—AT&T 4
- 3 AT&T's Strategic Alliances 7
- 4 INPUT's Evaluation of AT&T's SI Capabilities 8
- 5 Examples of AT&T's SI Projects 9

#### AMS

- 1 AMS Offerings by Market 2
- 2 AMS Markets: Size and Growth 3
- 3 AMS 1989 Systems Integration Revenues 3
- 4 AMS Margins 5
- 5 AMS Submarkets 6
- 6 AMS Organization—Centralization and Decentralization by Line of Business 8

#### AIS

- 1 Key SI Competitors 2
- 2 Systems Integration Organization 4

#### AC

- 1 Key Parameters of Andersen Consulting's Consulting/SI Business 2
- 2 Andersen Consulting's Competitive Status 3
- 3 Andersen Consulting—Major Recent Developments 6
- 4 Andersen Consulting Organizational Structure 8
- 5 Andersen Consulting—Integration Services and Technology—Americas 9
- 6 Centralization/Decentralization of SI Business Function—Andersen Consulting 10
- 7 Distribution of SI Business Personnel—Andersen Consulting 12
- 8 Andersen Consulting—Applications Software Products—Some Examples 14
- 9 Andersen Consulting—SI Strategic Alliances (Limited Sample) 17

## Exhibits (Continued)

### IV

-10 Andersen Consulting Marketing Strategy	18
-11 Examples of Andersen Consulting's SI Contracts	20

### BDM

-1 BDM Financial Summary	2
-2 Mix of Products and Services	3
-3 Level of Relative Margins Realized from SI Components	11
-4 Vertical Markets Served by BDM	12
-5 BDM's Approach to SI Responsibilities	14
-6 BDM Gateways	15
-7 BDM Primary SI Capabilities	17
-8 BDM's Principal Customers and Products	19

### BCS

-1 BCS—Systems Integration Revenues, 1989	2
-2 BCS Strengths and Weaknesses	3
-3 Boeing Organization	4
-4 BCS Strategic Alliances	10
-5 BCS Marketing Strategy	12
-6 BCS Summary	14

### BUL

-1 Distribution of SI Contract Values at Bull	2
-2 Bull's SI Target Market Opportunities	3
-3 Centralization/Decentralization of SI Business Functions at Bull	4
-4 Distribution of Staff Capabilities to SI Activities—Bull	5
-5 Distribution of Bull's SI Employees	5
-6 Bull's SI Capabilities and Use of Alliances	6
-7 Bull's Primary Competition—Commercial and Federal	8
-8 Typical Groupe Bull SI Projects	9



# Exhibits (Continued)

## IV

### CBIS

- 1 SI Vertical Market Focus—CBIS 3
- 2 Key SI Competitors 6

### CSC

- 1 Computer Sciences Corporation Fiscal Year 1992 by Business Segment 2
- 2 Computer Sciences Corporation Systems Integration Profile 3
- 3 Computer Sciences Corporation Change in Federal versus Commercial Revenue: FY 1988 thru 1992 4
- 4 Computer Sciences Corporation SI Industry Commercial Leadership Elements 5
- 5 Computer Sciences Corporation SI Industry Markets 7
- 6 Computer Sciences Corporation 8
- 7 Computer Sciences Corporation Staff Allocation 9
- 8 Computer Sciences Corporation Centralization/Decentralization of SI Business Functions 10
- 9 Relative Profitability CSC System Integration Components 11
- 10 Computer Sciences Corporation SI Business Objectives 12
- 11 Computer Sciences Corporation Self-Assessed Capabilities 13
- 12 Computer Sciences Corporation Methods of Promotion 15
- 13 Computer Sciences Corporation Competitors 16
- 14 Computer Sciences Corporation SI Marketing Strategy 16

### CTG

- 1 Markets Served 4
- 2 Centralization/Decentralization of SI Business Function—Computer Task Group 7
- 3 Distribution of SI Personnel—Computer Task Group 8
- 4 Examples of CTG's Key Alliances 11
- 5 CTG's SI Marketing Strategy 13
- 6 Computer Task Group Three-Year Source of Revenue Summary 14
- 7 Computer Task Group SI Project Examples 15

# Exhibits (Continued)

## IV

### CDC

-1 Federal/Commercial Market Revenue Split	2
-2 SI Vertical Market Focus	3
-3 Control Data Corporation Organization	4
-4 Key SI Competitors	7

### C&L

-1 C&L's Target Market Opportunities	2
-2 C&L's SI Management Matrix (Partial)	3
-3 Centralization/Decentralization of SI Business Functions—C&L	4
-4 C&L's Stated Business Objectives	4
-5 SI Business Capabilities/Products Evaluation—C&L	5
-6 Limited Sample of C&L's SI Alliances	6
-7 C&L's SI Competition	8

### DEC

-1 DEC Systems Integration Revenues, 1989	2
-2 DEC SI Target Market Opportunities	3
-3 DEC Enterprise Integration Services Organization	5
-4 DEC—Limited Sample of SI Alliances	9
-5 INPUT's Evaluation of DEC's SI Capabilities	10
-6 Distribution of SI Revenue by Class of Service/Product	11
-7 Examples of DEC SI Projects	12

### EDS

-1 SI Vertical Market Focus—EDS	3
-2 Revenue by Market Sector	3
-3 Recent Major Developments	4
-4 EDS Organization	5
-5 EDS Systems Integration Revenues, 1989	6
-6 Distribution of SI Personnel—EDS	6
-7 Centralization/Decentralization of SI Business Functions—Electronic Data Systems	7
-8 EDS Business Objectives	8
-9 EDS—Strategic Alliances	10
-10 EDS' Competitive Status	11

## Exhibits (Continued)

### IV

- |     |   |    |
|-----|---|----|
| -11 | EDS SI Marketing Strategy                 | 12 |
| -12 | Examples of EDS's Customers and Contracts | 13 |

### GDS

- |    |   |    |
|----|---|----|
| -1 | Grumman Data Systems Competitors  | 3  |
| -2 | Grumman Data Systems Market Summary Based on Technical Capabilities           | 4  |
| -3 | Grumman Data Systems Staff Allocation   | 6  |
| -4 | Grumman Data Systems Centralization/Decentralization of SI Business Functions | 6  |
| -5 | Grumman Data Systems Self-Assessed Capabilities                               | 8  |
| -6 | Grumman Data Systems Marketing Strategy                                       | 9  |
| -7 | Grumman Data Systems Methods of Promotion                                     | 10 |

### GTE

- |    |   |    |
|----|---|----|
| -1 | GTE Government Systems Corporation Organization | 6  |
| -2 | GTE Vantage Solutions Installations             | 7  |
| -3 | GTE Federal Systems Division Organization       | 8  |
| -4 | GTE Markets                                     | 9  |
| -5 | Responsibilities                                | 11 |
| -6 | Competitors                                     | 15 |
| -7 | GTE Government Systems SI Project Examples      | 16 |

### HAC

- |     |  |    |
|-----|--|----|
| -1  | Summary of HITC Mission                              | 3  |
| -2  | Organizational Components                            | 4  |
| -3  | AAGR and Margins                                     | 6  |
| -4  | Vertical Markets                                     | 6  |
| -5  | HITC Organization                                    | 9  |
| -6  | Hughes STX Organization                              | 10 |
| -7  | SI Contract Responsibilities—Organizational Approach | 11 |
| -8  | Relative Margins Integration Components              | 13 |
| -9  | Hughes STX Alliances                                 | 14 |
| -10 | HSTX Competitors                                     | 17 |
| -11 | HITC Competitors                                     | 17 |
| -12 | HLS Competitors                                      | 18 |
| -13 | Hughes STX Customers                                 | 19 |

## Exhibits (Continued)

### IV

#### IBM

-1	IBM U.S. Organization	3
-2	IBM Application Solutions Line of Business	5
-3	IBM Staffing for the SI Business	6
-4	Centralization/Decentralization of SI Business Functions	6
-5	IBM 1990 Systems Integration Revenues	7
-6	IBM Strategic Partners in Systems Integration	11
-7	INPUT's Evaluation of IBM's Capabilities	12
-8	IBM SI Project Examples	13

#### KPM

-1	KPMG Peat Marwick SI Business, 1988 and 1989	1
-2	KPMG Peat Marwick Technologies and Target Applications	3
-3	KPMG Peak Marwick SI Business Functions: Centralized/Decentralized	4
-4	Distribution of SI Personnel—KPMG Peat Marwick	5
-5	KPMG Peat Marwick Assessment of SI Capabilities and Use of Alliances	6
-6	KPMG Peat Marwick's Alliance Strategy	7
-7	KPMG Peat Marwick Strategic Alliances	7
-8	INPUT's Evaluation of Peat Marwick's SI Capabilities	8
-9	Peat Marwick's SI Competition	9
-10	KPMG Peat Marwick's Marketing Strategy	10

#### LI

-1	Parameters of Litton's SI Business	3
-2	Summary of Markets	3
-3	Summary of Litton's SI Capabilities	9
-4	LCS's Strengths and Weaknesses In SI	11

#### LOCKHEED

-1	SI Markets	8
-2	Strategic Alliances—FORMTEK	17

## Exhibits (Continued)

### IV

#### MM

-1 Target Market Selection Criteria	6
-2 Martin Marietta's Federal SI Process	8
-3 MMIS Staffing	9
-4 Martin Marietta ISC's SI Capabilities	11
-5 Martin Marietta Alliances	12
-6 Martin Marietta's SI Competitors	13
-7 Martin Marietta ISC's Major SI Products	13

#### MCD

-1 McDonnell Douglas Information Systems Company Restructuring	2
-2 McDonnell Douglas Information Systems Company—1989 Systems Integration Revenues	3
-3 McDonnell Douglas Systems Integration Company Profit Centers	4
-4 Representative McDonnell Douglas Systems Integration Company Projects	8

#### NCR

-1 Centralized versus Decentralized Management	3
-2 NCR's SI Capabilities Ratings	5
-3 INPUT's Evaluation of NCR's SI Capabilities	7

#### NYN

-1 NYNEX—1989 Systems Integration Revenues	2
-2 NYNEX Information Solutions Group, Inc.—Organization	6
-3 NYNEX Complex Systems Integration Group—Services Offered	7

#### PRC

-1 PRC's 1989 SI Revenue and SI Staffing	2
-2 Distribution of SI Staff Effort at PRC	3
-3 Centralization/Decentralization of SI Business Functions at PRC	4

## Exhibits (Continued)

### IV

-4 PRC's Self-Assessment of SI Capabilities and Use of Alliances	5
-5 Brief Sample of PRC's SI Alliances	6
-6 PRC's Primary Competition	8
-7 Examples of PRC's SI Projects	9

### PW

-1 Price Waterhouse Systems Integration Revenues—1989	1
-2 Price Waterhouse's SI Target Markets	3
-3 Price Waterhouse National/Regional SI Business Alignment	4
-4 Price Waterhouse's Evaluation of Capabilities	5
-5 Price Waterhouse—Limited Sample of SI Alliances	6
-6 INPUT's Evaluation of Price Waterhouse's SI Capabilities	7

### SAI

-1 SAIC—1991-1992 Systems Integration Revenues	2
-2 SAIC Historical Revenue	3
-3 SAIC—Three-Year Source of Revenue Summary	6
-4 SAIC Relative Profit Margins	7
-5 SAIC Segment and Sector Organization Chart	13-14
-6 SAIC Organizational Structure	15
-7 SAIC Systems Integration Staff Distribution	19
-8A SAIC In-House Capabilities (No Alliances)	20
-8B SAIC In-House Capabilities (With Alliances)	21
-9 SAIC Alliances and Purpose	22

### SHL

-1 SHL Systems Integration Revenues, 1989	2
-2 Systemhouse U.S. Organization	6
-3 Centralization/Decentralization of Business Functions—Systemhouse	7
-4 Distribution of SI Personnel—Systemhouse	8
-5 SHL Systemhouse Strategic Alliances	11
-6 Examples of Systemhouse's SI Programs	13

## Exhibits (Continued)

### IV

#### STM

-1	STM's Estimated Fiscal 1988 and 1989 Revenues	1
-2	Centralization/Decentralization of SI Business Functions at STM	3
-3	STM's SI Capabilities	4
-4	A Sample of STM's Strategic SI Alliances	5
-5	INPUT's Evaluation of STM's SI Capabilities	5
-6	STM's Competition in SI Markets	6
-7	Examples of STM's SI Projects	7

#### TSC

-1	TSC Organizational Chart	3
-2	Distribution of Staff Capabilities	4

#### TRW

-1	Operating Divisions	2
-2	TRW Organizational Changes	4
-3	Markets	6
-4	Applications	6
-5	Customer Base	12

#### UNI

-1	Unisys' SI Target Market Opportunities	7
-2	Centralization/Decentralization of SI Business Functions—Unisys	13
-3	Distribution of Commercial SI Personnel—Unisys	15
-4	Unisys's Assessment of SI Capabilities and Use of Alliances	17
-5	Unisys Marketing Strategy	21
-6	Systems Integration Components	22
-7	Unisys SI Projects	24
-8	Unisys Technology and Projects	25

## Exhibits (Continued)

### V

-1	Distribution of SI Vendor Interviews (All Profiles)	V-2
-2	Distribution of SI Vendor Interviews (1992 Profiles)	V-2
-3	Primary Organizational Structure for Systems Integrators (All Profiles)	V-3
-4	Degree of Centralization of Business Function (All Profiles)	V-4
-5	Allocation of SI Resources by Function (1992 Profiles)	V-5
-6	Ongoing Organizational Structure—Changes by SI Vendors	V-6
-7	U.S. Systems Integration—Top Ten Vendors and Primary Sources, 1991	V-7
-8	Trends in SI Profitability	V-9
-9	Margins by Integration Component (1992 Profiles)	V-10
-10	Project Composition—Distributed versus Mainframe Processing	V-11
-11	Overall SI Capabilities by Vendor Class (1991)	V-12
-12	Comparison of Capabilities Importance	V-13
-13	Use of Proprietary Technologies/Products	V-14
-14	Incidence of Proprietary Products by Category	V-15
-15	Secondary SI Vendors	V-16
-16	SI Technology Drivers—1990s	V-17
-17	Project Selection Criteria—1991 versus 1992	V-18
-18	Vendor Business Objectives in SI (1992)	V-19
-19	SI Vendor Market Focus—1991 versus 1992	V-20
-20	Vendor Goals and Objectives	V-21
-21	SI Vendor Advertising/Promotion Preferences In Order of Preference/Effectiveness (1992)	V-21
-22	Formal Alliance Structures	V-23
-23	Most-Often-Mentioned Reason for Alliances	V-23





## Introduction

While most systems integration (SI) vendors have managed to increase their business during the 1991-1992 recessionary period, only a few have managed to grow in excess of the market rate. Among those that have experienced dramatic increases are a significant number that only recently addressed systems integration as a major profit center (due to a dedicated marketing/sales effort) and hence, started from a relatively low level from which a relatively modest sales advance would be statistically impressive.

Though many vendors are reluctant to discuss profitability, it would appear that few are experiencing a significant increase. Most appear to be holding at a stable level, while some are experiencing a decline in profitability.

Even among those maintaining prior profit levels, the cost of doing so has been at the expense of personnel. Staff cutbacks have been made at some firms, while many others are demanding that their managers maintain tighter controls and achieve higher productivity with fewer resources.

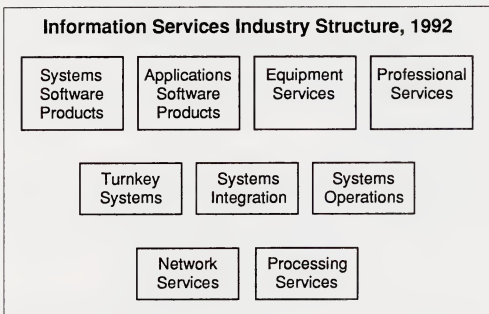
The end of the Cold War and the increase in global competition has brought profound and permanent changes to the marketplace. Just as economists are struggling to define the precise nature of those changes in the global economy, so too are systems integration vendors struggling to define the elements necessary to compete successfully in their market.

Nonetheless, SI market growth is continuing. It is only the direction the industry is taking and the issues surrounding it that require significant analysis. INPUT is continuing its research begun in 1987, exploring buyer and vendor issues and current SI project characteristics, and refining its short- and long-term market projections.

For 1992, INPUT is expanding its chart of major delivery elements in the information services industry. Exhibit I-1 shows the positioning of systems integration relative to other delivery modes (as included in the 1991 report) with one addition: equipment services have now been added as a ninth delivery mode. Also, the increasing importance of "Secondary SI Vendors" to the industry is reflected in the chart as well. INPUT believes

that the growing complexity of SI projects will increasingly involve the need to expand the use of such vendors, either through long-term alliances or on a contract-by-contract basis.

## EXHIBIT I-1



This report must necessarily focus not only on the vendor community, but on the attitudes and requirements of buyers as well. It is the profound changes in the user community that are driving vendor responses and ultimately pushing vendors to treat systems integration as the major information services industry mode it has become.

## A

## Objectives

The primary object of this report is to present a current and accurate analysis of vendor position and direction in the systems integration market. As a part of that profile, a forecast of market trends over the next five years and a discussion of user requirements driving those trends will also be included. The report contains detailed discussions which are summarized in Exhibit I-2. They are:

- Individual profiles of 33 systems integration vendors with 15 profiles which were updated or newly added in 1992
- The strategies and positions of these vendors in the systems integration marketplace, as well as the degree of success they are experiencing
- The likely scenario for development of the competitive structure of SI services over the next five years

- Buyer/user concerns that will be driving these developments; the shape they are taking today and will likely take in the years to come

In addition to the primary objective, there are several secondary objectives, also summarized in Exhibit I-2. They are:

- Describing the role of alliances in the systems integration marketplace and the problems involved;
- Showing the increasing importance of secondary system integration vendors;
- Clarification of the definitions used in describing the market and the competition.

EXHIBIT I-2

## Report Objectives

### Primary Study Objectives

- Vendor profiles
- Strategy and position definition
- SI five-year competitive scenario
- Buyer/user concerns driving the market

### Secondary Study Objectives

- Role of alliances
- Importance of secondary vendors
- Clarification of market definitions

## B

### Scope and Methodology

#### 1. Scope

This report focuses on the domestic U.S. commercial SI market. However, due to the nature of the market and competition, there is information presented that reflects developments in the federal market and, to some extent, Canada and other foreign markets.

1991 and 1992 information on revenues and markets were used wherever possible. Similarly, INPUT adjusted some vendor information when it was necessary to obtain comparisons within a common set of definitions.

All of the other (non-financial) information used in the analysis was obtained in the period from early 1991 to late 1992 and therefore reflects the most recent data available.

## 2. Methodology

Information used in this analysis was obtained from three primary sources and a number of secondary sources. The primary sources of information are described below.

There were in-depth interviews conducted with 34 firms. Key contacts at each vendor site were identified, and a questionnaire (Appendix A) was mailed to the interviewee. The questionnaires returned by interviewees were clarified and/or completed over the telephone. Data from this survey was utilized in the competitive analysis and to develop individual vendor profiles.

INPUT's annual vendor survey also provided significant data for the study. Each year INPUT surveys approximately 950 companies in the information services industry. Current revenue data collected on SI vendors, vertical markets, and professional services was used in analyzing SI competitive trends.

Each year INPUT surveys approximately 250 of the Fortune 500 information systems executives on budgets, issues, technology, and trends. In the 1992 survey, information specific to the use of outside services and systems integrators was collected and has been used in the systems integration competitive analysis.

EXHIBIT I-3

### Primary Information Sources

- In-depth interviews with 34 SI vendors
- INPUT's Annual Vendor Survey
- INPUT'S annual survey of 250 of the Fortune 500

In addition to these primary sources, some secondary sources of information were used in the analysis. These are summarized in Exhibit I-4.

---

EXHIBIT I-4

### Secondary Information Sources

- Vendor-provided publications
- INPUT's 1992 market forecast
- INPUT's proprietary vendor files
- *U.S. Systems Integration Markets, 1992-1997\**

\* INPUT report

Most of the data collected from the vendor surveys were tabulated, and individual profiles were prepared using all data sources.

Senior INPUT personnel conducted in-depth interviews with senior managers of 34 systems integration vendor firms during the period of 1990-1992. Exhibit I-5 describes the subject areas of those interviews.

## EXHIBIT I-5

**Interview Subject Areas**

- Background and strategy
  - Skills and capabilities
  - Business objectives
- SI organization/responsibilities
  - Organizational structure
  - Key contacts/number of personnel
  - Centralization of function
  - Distribution of personnel by skill
- Contract characteristics
  - Mainframe versus distributed
  - Service components
- Financial characteristics
  - Revenues/margins/profitability
  - Pricing policies
- Strategies and markets
  - Vertical and functional focus
  - Method of prospecting
  - Positioning/promotion
  - Capabilities and products
  - Competitors
  - Alliances

Fifteen interviews were conducted in 1992. Seven of those updated prior vendor profiles; eight were first-time interviews/profiles. In general, an attempt was made to address types of vendors not extensively covered previously, or those whose market segment is in particular turmoil, such as aerospace companies. The total list of companies (by type) is contained in Exhibit I-6.

## EXHIBIT I-6

## 1992 Vendor Survey Participants by Class

Class	Survey Respondents
Equipment Manufacturers (8)	Bull HN, Control Data, DEC, IBM, NCR, Unisys**
Communications Companies (4)	Ameritech, AT&T, Cincinnati Bell*, GTE*, NYNEX
<u>Professional Services Companies</u> Consulting-Based Companies (4)	Andersen Consulting**, Coopers & Lybrand, KPMG, Price Waterhouse
IS Professional Services (9)	AMS, BDM*, Computer Sciences (CSC)**, Computer Task Group (CTG)**, PRC, Science Applications Intl. (SAIC)**, SHL Systemhouse, STM, Technology Solutions Company (TSC)*
Systems Operations (3)	Boeing Computer Services, EDS, Litton Computer Services (LCS)**
Aerospace Companies (6)	Grumman**, Hughes/GM*, Lockheed*, Martin Marietta*, McDonnell Douglas, TRW*

\*New (first time) profile in 1992.

\*\*Profile updated from prior year.

An analysis of each vendor was produced based on those interviews, materials received from vendors (e.g., promotional literature and quarterly and annual reports), and materials collected independently by INPUT and maintained in individual vendor files. The intent of each profile is to provide a picture of the vendor's general business characteristics and its specific approach to the systems integration market.

Vendor profiles are collected in Chapter IV.

Profiles were released as they were developed prior to the publication of this report. Additional profiles will be released in the future as part of INPUT's Systems Integration Program.

In addition to the profiles, the information gathered in surveys was combined and analyzed to identify trends and issues relevant to the competitive market. This information was combined with INPUT's buyer/user data to more sharply define the significant factors driving the systems integration market and, specifically, the vendors that service it.

## C

### Report Structure

---

The balance of this report is organized as follows:

Chapter II is an Executive Summary, outlining and highlighting findings and conclusions.

Chapter III goes into the details of SI vendor Competitive Structure. It is in this chapter that INPUT provides an analysis of the overall systems integration market today and how it appears to be evolving. Also included is an analysis of how SI vendors are responding to buyer/user initiatives.

Chapter IV provides a Comparative Analysis of SI vendor strategies, organization, capabilities, offerings, and likely directions.

Chapter V provides individual profiles of 33 SI vendors. Fifteen of these profiles are either new or updated in 1992.

Appendix A contains the vendor questionnaire used to obtain the primary research information used in the report.

## D

### Related INPUT Reports

---

Recent INPUT reports relevant to the systems integration market include:

- *Systems Integration Trends and Forecasts, 1992-1997*
- *U.S. CIM Systems Integration Market, 1990-1995*
- *Network Integration—A Growing Market*
- *Program Management in Systems Integration*
- *Federal Systems Integration Markets, 1992-1997*
- *Outsourcing Market Opportunities, 1992-1997*





## Executive Overview

While this report focuses on vendor competition in the systems integration market, more attention this year must be paid to the changing nature of the SI market itself. Ten years ago, when INPUT began analyzing systems integration as a part of professional services, there might have been some question about SI being a distinct and separate market. That issue, however, has long since been laid to rest by virtue of the sheer size of the SI market (over \$9 billion in 1992).

It is also apparent that a combination of rapidly evolving technology and equally rapid political and overall economic change has come together over the last two years. This has clearly had a substantial impact on the industry. The very definitions of the various market segments are in a flux.

The objective of this report is to identify these trends and issues, with the specific goal of assessing how they will impact the positions and strategies of SI vendors over the next five years. INPUT will present a current and accurate analysis of the key strategies and major players in the industry. The emergence of secondary systems integration vendors will also be addressed as a reflection of the changes taking place in the SI market.

### A

---

## Background

As previously mentioned, INPUT first identified systems integration as a distinct IS delivery mode over ten years ago. Even at that time it was apparent that SI represented a potentially enormous market. In 1992, even with its numerous problems, SI was the leading growth segment of the industry.

In 1987, INPUT stopped categorizing SI as a segment of professional services and began tracking and forecasting revenues for SI in aggregate and across major industries. That process has continued annually ever since.

For 1992 INPUT has modified its reporting procedures somewhat, adjusting to the changes and/or evolution of the market as follows:

- "Equipment Services" is now included as a ninth mode of delivery in INPUT's chart of the "Information Services Industry Structure" (Exhibit I-1).
- The industry list against which INPUT tracks SI revenues has been modified. "Miscellaneous Industries" has been eliminated and "Discrete Manufacturing" and "Process Manufacturing" have been combined into the single category of "Manufacturing," reducing the industry list from fifteen to thirteen.
- While INPUT continues to survey and track vendor company organizational structure, less space will be devoted to describing the results, which were consistent with those reported in 1991.
- Like every good study, the results of INPUT's 1992 *U.S. Systems Integration Vendor Analysis* raised as many questions as it answered. It was clear that a more finely honed set of questions will be necessary to quantitatively assess vendor market views. Hence, INPUT has drawn significantly on and extrapolated from market data acquired in its *Systems Integration Trends and Forecast, 1992-1997* to help address these issues.

A reading of the individual vendor profiles, particularly those conducted in 1992, will be particularly useful in driving home the point. While some seem to have a clear goal in sight, others are still trying to "find their footing."

## B

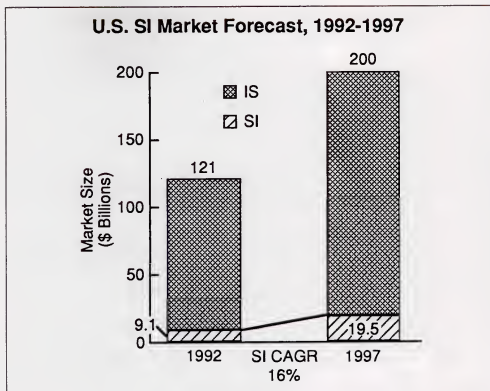
### Trends and Issues

---

#### 1. Market Overview

Despite a recessionary economy and an anemic recovery in 1992, the \$10 billion increase in the information services industry ranks it as a relatively strong sector in general, and the fastest growing part of the computer business. The industry will continue on a slower growth path in the 1990s than it experienced in the 1980s, but will exceed the \$200 billion mark by 1997, with a steady \$20 to \$25 billion increase annually. As illustrated in Exhibit II-1, systems integration will increase as a percentage of IS volume from approximately 7.5% in 1992 to about 10% in 1997.

EXHIBIT II-1



INPUT's definition of a systems integrator is shown in Exhibit II-2. It emphasizes that a vendor be capable of supplying a complete solution to complex requirements involving the custom selection and implementation of products and services.

EXHIBIT II-2

### SI Vendor Capability Definition

- Business/information consulting
- Complete solution to complex technical requirements
  - Mainframe, minicomputer and PC sources
  - Applications software
  - Telecommunications
  - Networking
  - Data communications
- Background in specific industries
- Project management capability
- Financial ability to assume risk

The systems integrator typically has project management responsibility—the overall management for delivery of the end product—which typically includes equipment, software, and communications. The integrator also coordinates teaming arrangements with outside suppliers for engineering, data processing, and personnel resources and the documentation, training, and post-implementation support required by the client.

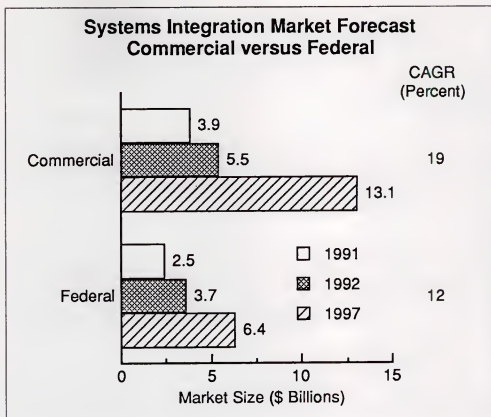
The vendors' responsibility includes financial risk for the success of the system. As part of the contract, the SI vendor gives a warranty for success. This essentially guarantees that the system will be delivered as promised, will operate according to contractual specifications, and will come in at the agreed-upon cost.

In general, systems integration projects involve complex, multidisciplinary information systems with the following characteristics:

- Projects are usually multiyear.
- Project management demands are significant.
- Target systems are usually strategically significant to the client's organization.
- The system typically requires custom software and may include a large network and/or communications requirement.

The federal market has been and continues to be the largest individual market for SI. Despite its slowing growth rate and diminished profitability, it is a large, established market which will continue to be attractive over the next five years. However, the higher growth rate and profitability, combined with the ultimate size of the commercial market (see Exhibit II-3) will increasingly attract systems integrators who previously concentrated exclusively on the federal sector.

EXHIBIT II-3



On a worldwide basis, the information services industry continues to experience growth rates of close to 20%. Many U.S. vendors are experiencing growth overseas that exceeds the U.S. industry as a whole. In turn, some international vendors are penetrating the U.S. market.

Although the economic recession was the principal factor causing the drop in the rate of growth for systems integration and other information services during the past two years, it did not have an equal impact on the use of systems integration in various markets or on the vendors offering these services.

The market for systems integration is more sensitive to economic conditions than has previously been the case. Budgets for information systems are growing more slowly and a small percentage actually show a decrease. Companies that are able to invest in information technology during slow economic times will be best positioned to grow their business when the recovery accelerates. Virtually no one argues about the relationship between competitiveness and productivity. Information technology is the key to productivity.

## 2. Buyer/User Issues

Users are increasingly becoming buyers. As illustrated in Exhibit II-4, the resulting change in focus is changing the nature of the SI market.

EXHIBIT II-4

### Major Buyer/User Issues

- Competitive demands force core business focus
- Internal control versus inadequate skills
- Users become buyers
- Increasingly complex technology demands
- Full service/liability demands on SI vendors
- Smaller projects, faster results

Two factors are driving this phenomenon. Firstly, IS managers initially ignored microcomputers and workstations as they penetrated middle management ranks. As the technology matured, so did the users, who now increasingly occupy upper middle and senior management positions.

Secondly, domestic and international competition have forced management to concentrate on its core business. More is demanded from information, at less cost. "Leading edge" technology is suspect unless it can be demonstrated that it supports a company's strategic objectives in the most tangible terms, e.g., producing higher quality products at lower cost, shortening response time, or improving market data gathering.

There is also a demand for more modular projects which can be implemented more rapidly and at lower cost. Manufacturing is hard pressed to consider large, complicated, "total" solutions. They demand modularized systems, arranged in less ambitious, more affordable packages. Many users are reacting to prior applications that left them "data swamped" but "information poor."

To take advantage of the most specific and cost-effective technologies in any given area, users are (and have been) downsizing. In many cases, downsizing simply spreads pre-existing process problems to a host of smaller machines or creates a host of new problems.

Re-engineering then becomes necessary, which in large part is the reason that the IS/SI industry has been re-invigorated. On the other hand, the demand for the integration of a variety of platforms and operating systems, tied into existing mainframes, capable of operating on a twenty-four-hour basis, internationally, creates an integration and networking problem demanding the very leading edge technology that arouses management suspicion in the first place.

The demand for short-term, small projects and fast payback is also putting a strain on infrastructure maintenance and enhancement projects. In some sectors the problem is so pronounced that at least one professional services firm is openly advocating that IS managers "bury" infrastructure costs in a variety of short-term projects, with the assurance that they will emerge as "heroes" in the future.

The greater user awareness of SI potential is also increasing the demand on vendors for full service/complete solution capability. The issue of liability is no doubt driving the phenomenon.

At the same time, two factors in user organizations serve to challenge even that basic requirement. First, as user sophistication increases, so too does the demand for buying power, both on a functional and divisional/departmental level. Second, mergers and acquisitions create their own problems of supplier preference and multiple platforms.

### 3. Vendor Issues

The 1991-1992 period has been one of challenge for systems integration vendors which will be rivaled by the next five years. While industry growth is inevitable, it will certainly not be as strong or as predictable as that of the 1980s.

Financial commitment, accompanied by liability factors, looms larger than ever, in terms of both corporate investment/return issues and project management exposure. In fact, the review of vendor issues in Exhibit II-5 can essentially be summed up in a word: risk.

## EXHIBIT II-5

**Major Vendor Issues**

- Increasing competition
- Full service buyer demands
- Technology and personnel investments
- Alliances and mergers
- Secondary vendor relationships
- Reduced project size
- New marketing demands

With cutbacks in defense, vendors specializing in this sector are eyeing civilian agencies for new markets. Vendors comfortably established in the federal civilian sector are moving into state, county, and local projects. Both are exploring the private sector for new business prospects.

Outsourcing vendors are responding to buyer demands for "full service." In the process they are redefining the term and blurring the distinction between outsourcing and SI.

Common wisdom suggests that front-end business consulting and back-end processing provide a route to capturing a client throughout the entire development and operations cycle. There is certainly an advantage to the firm that both writes the specifications for a project and then offers the capability to fulfill the requirements.

Technology issues are driving an increasing dependence on secondary vendors, particularly in the area of integration, networking, and communications. In many cases, SI vendors are prone to forget that the primary orientation of such vendors is the sale of a product. While they might desire to provide the high level of support demanded by an SI client, they are frequently not equipped to do so.

The trend toward smaller projects in larger companies will no doubt drive vendors into a search for additional markets among medium-sized companies, a choice which they might not have considered three or four years ago. This will force SI vendors into a new business prospecting mode with which many will be unfamiliar. How the marketing elements of advertising, promotion, and public relations fit into that mix will represent a new learning experience for many SI vendors.



## C

## Primary Findings

## 1. Competitive Structure

Exhibit II-6 provides an overview of the top five SI vendors in 1991, covering both the commercial and federal sectors. What is interesting to note is the total share of the market these vendors represent. In 1990, the top ten vendors accounted for 79% of the market. One year later, the share of the top ten was only 66%.

EXHIBIT II-6

**U.S. Systems Integration  
Vendor Market Share, 1991**

Vendor	Percent
1. IBM	17
2. Andersen Consulting <sup>(1,2)</sup>	8
3. EDS	8
4. Digital	6
5. Computer Sciences Corporation <sup>(2)</sup>	5

(1) Includes INPUT's estimate of equipment content

(2) Adjusted to calendar year 1991

Competition is becoming fierce in an industry that five years ago was considered fledgling. INPUT now counts 39 companies with SI business in excess of \$50 million in 1991. Foreign competition is also on the rise with entrants such as Cap Gemini Sogeti and SAP.

IBM was the leader in both the commercial and government sectors in 1991. It formed Integrated Systems Solutions Corporation (ISSC), primarily to focus on outsourcing. But IBM has already begun to shift its Technology Centers to ISSC control and has indicated a restructuring of its sales organization to allow for far greater autonomy and an announced vertical market focus. As has already been pointed out, outsourcing vendors are now taking on entire technology infrastructures, redefining and blurring previous boundaries.

Andersen Consulting continues to demonstrate dramatic growth in the SI market, moving from third overall in 1989 to second in 1991. It has done so almost exclusively in the commercial sector.

EDS, while a leader in processing services, is taking full advantage of its manufacturing and telecommunications resource in its parent company, General Motors. Systems integration will serve to protect existing processing accounts and aid the firm in developing new ones.

Exhibit II-7 shows the top five SI vendors in the commercial sector.

EXHIBIT II-7

### **U.S. Commercial Systems Integration Vendor Market Share, 1991**

Vendor	Percent
1. IBM	18
2. Andersen Consulting	17
3. Digital	10
4. EDS	7
5. TRW	5

Digital's ranking has increased substantially over the past few years, replacing Unisys in the top-five vendor ranking. While the firm is no doubt protecting its equipment business in its long-held position in the manufacturing sector, Digital is clearly moving toward open systems, starting with its announced intention of cleaning up its own product lines.

A very large question is how the major players in the federal market are going to move, particularly those heavily committed to a shrinking defense market. Exhibit II-8 shows the top five SI vendors in the federal sector.

## EXHIBIT II-8

**U.S. Federal Systems Integration  
Vendor Market Share, 1991**

Vendor	Percent
1. IBM	16
2. EDS	9
3. SAIC	8
4. Martin Marietta	8
5. Computer Sciences Corp.	7

Many vendors have attempted to take their strong technical resources and apply them to civilian and commercial applications. Image processing is a popular area, but already highly competitive. It is also a fairly difficult sale in a weak economy, outside of companies and agencies with highly specialized and specific requirements.

All of these companies have learned to operate in the unique market that is the federal government. In general, they do not transfer well to the private sector and, given the continuing lure of large federal contracts, it has yet to be seen how many of the major federal players will be able to make the transition.

**2. Secondary SI Vendors**

Secondary SI vendors have made significant inroads into the IS market over the last year. SI technology drivers such as relational data bases, networking/connectivity, distributed systems, client/server architecture, and the general demand for open systems have increased the technical complexity of typical SI projects and opened the door to specialists who can solve problems for mainstream SI vendors.

As Exhibit II-9 illustrates, secondary vendors have much to offer on a technical level and are too weak financially to offer much of a marketing threat. Aside from the obvious limitations listed, the downside of such a relationship is certainly manageable.

## EXHIBIT II-9

**Secondary SI Vendors**Perceptions

- High interest level in SI—a new market
- Generally do not want to be prime contractor
- SI—a growing part of their business
- Know who major players are
- Want visibility to major players for specific capabilities

Limitations

- Experience base often limited
- No large project management experience
- Narrow (highly specialized) technical skills
- Lack of financial resources
- If software or turnkey, restricted to own solution
- Geographically limited

On the other hand, the ongoing proviso remains regarding the inherent danger of alliances. While a secondary vendor is not in a position to directly challenge a mainstream SI vendor, the freedom to ally itself with another vendor that can is certainly a very real possibility.

Another real problem lies in the different interests of the SI vendor versus the secondary vendor. The former expects to earn significant profits from professional services. The latter, depending on the application, frequently earns its revenues from the sale of hardware or software, where margins are not always great enough for the secondary vendor to provide the level of support that might be required.

Such relationships are inevitable and potentially mutually beneficial. However, as much care must be taken to pre-define the relationship and obligations as is done with the client.

**D****Conclusions and Recommendations**

Successful SI vendors are going to be dealing, for the most part, in unfamiliar territory over the next few years: the world of marketing and promotion. This world is comprised of the rough and tumble world of the advertising, not the subtle world of client references, promotional seminars, and the occasional fling at "corporate advertising". Thus, focused advertising, aggressive public relations campaigns and management trade show marketing all will encompass this rough world of marketing promotion.

That's why the first recommendation in Exhibit II-10 is to develop the skills necessary to direct such activity. It will be expensive and, without proper market positioning, potentially useless, if not damaging.

EXHIBIT II-10

**Recommendations**

- Analytical/promotional marketing skills development
- Develop industry-focused market strategies
- Present full service image
- Leverage unique capabilities and products
- Establish strategic partnerships (alliances)
- Manage risk
- Proprietary products and methodologies

Emerging from such an effort should be the development of an industry-focused market strategy. If the strategy developed makes sense, the SI vendor should be able to project a full service image, leveraging the firm's unique abilities and products.

Only the largest of system integrators can legitimately define themselves as full-service vendors across broad industry lines. For most, care must be taken to select vertical markets which they can legitimately claim as their own.

Even then, they need to manage risk. There will inevitably be some stretching in the establishment of credentials. A formal alliance program can do much to help in this area, shoring up company weaknesses with other SI vendors and/or secondary vendors that offer complimentary skills.

Proprietary methodologies and products can do well in the marketing mix. But care must be taken to avoid a dogmatic appearance, particularly in the commercial sector, and particularly with regard to product where open systems are viewed as ultimately desirable.



## Competitive Structure

The systems integration market is a reflection of the international economy as a whole. The industry is being profoundly affected by rapid advances in technology, combined with dramatic and equally rapid political and economic changes resulting from the demise of the Soviet Union.

Five years ago SI was a new industry, the existence of which as a truly identifiable, viable market entity was being seriously questioned. Many perceived it as merely a method for companies in the various sectors of the IS industry to bolster core business.

Today, discussions concerning SI frequently revolve around the issue of its "maturation" as a distinct sector. Some continue to question its viability, citing the impact of restructuring, downsizing, re-engineering, and outsourcing as fundamentally changing delivery modes in the IS industry, profoundly affecting SI to the point of extinction.

While there is no doubt that the SI market has been fundamentally and irrevocably changed over the last two to three years, it should also be mentioned that, despite a host of economic pressures, SI has fared rather well over the 1990-1992 recessionary period, both when compared to the IS marketplace and the overall computer industry, and especially in comparison to the other markets in the overall economy.

The SI industry has *grown* during the recession, albeit slower than in the previous decade. Profits have been squeezed. Individual companies and sectors have been hurt more than others, but overall the industry is strong.

SI vendors must simply adjust to the fact that they are no longer immune to overall market shifts and pressures. What once was an isolated marketplace, with a unique and highly predictable competitive profile, has now truly become an integrated part of the global economy.

In this section, INPUT will attempt to define the nature of the marketplace for SI products and services, primarily by concentrating on the needs of the user/buyers. In the next section, attention will be paid to how vendors are responding to the market and what changes will be required to respond more effectively.

SI vendor uncertainty in this area is apparent. While it is a common concern in the overall marketplace, it is a relatively new phenomenon in the SI industry.

## A

### Market Overview

---

#### 1. General Characteristics

General SI market factors seem to have stabilized in 1992. The largest growth over the next five years is clearly going to be in the commercial sector. Despite an overall decrease in total plant and equipment spending in 1991 (1%) and an anemic increase in 1992 (4%), SI continues to outperform overall spending by a significant factor (though industry growth has slowed overall from the 1980s). An improved economy will see pent-up demand drive the commercial sector to a compound annual growth rate of 19% between 1992 and 1997.

The federal government continues to invest in data processing and communications products and services. While increased budget deficits will no doubt drive Congress to impose some kind of fiscal restraints over the next five years, the need for productivity should balance such restrictions in the SI area and result in a 12% compound annual growth rate in overall federal SI spending from 1992 to 1997.

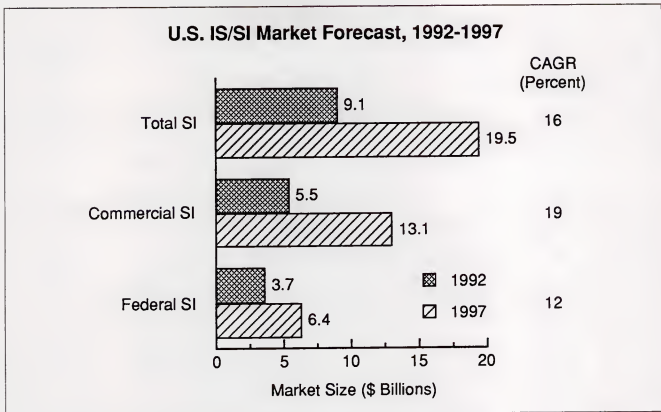
As illustrated in Exhibit III-1, with the lag in federal spending, the overall compound annual growth rate for the systems integration industry will be approximately 16%. While nowhere near the rates experienced in the 1980s, such growth still looks good in comparison to many other industries and projections for the overall economy.

Although profitability figures are the most difficult to obtain from vendors, profits in the federal sector have been reported and/or assessed as stable to decreasing. In the commercial sector profitability would appear to be stable to increasing.

Wide discrepancies in profitability have been noted between vendors, even when limiting the assessment within either the federal or commercial SI sectors. It would appear that individual firms are reflecting the degree of success with which they have been able to adjust to changing market factors.



EXHIBIT III-1

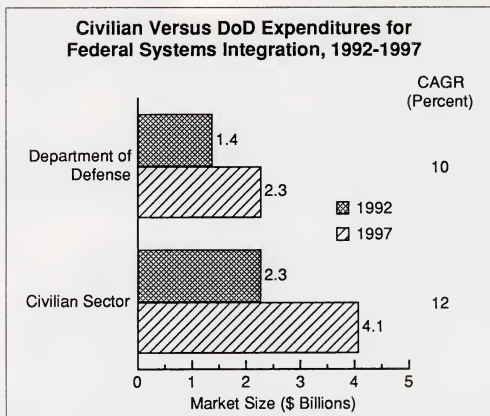


## 2. Federal versus Commercial Market

Anticipating a significant decline in defense spending, many vendors concentrating in this sector have been shifting. Noting the slowdown in federal SI growth, many federal contractors are attempting to shift some part of their marketing effort to the federal civilian sector and/or the commercial SI market.

While growth in the federal civilian sector is projected to exceed DoD spending, Exhibit III-2 shows that the difference in compound growth through 1997 (11% versus 12%) will not be sufficient to absorb the number of competitors from the defense sector seeking civilian projects.

EXHIBIT III-2



Vendors previously concentrating on federal projects who seek to enter the commercial sector will find even more significant problems. Exhibit III-3 illustrates the differences in project characteristics between the federal and commercial sectors. Clearly, the marketing/sales area will represent a major change for vendors seeking to make a transition.

## EXHIBIT III-3

### Commercial Versus Federal Systems Integration Characteristics

Characteristics	Commercial	Federal
<u>Customers</u>		
Requirements knowledge	Low	High
Technical knowledge	Variable	High
Interface	Multiple	Single
<u>Vendors</u>		
Vertical expertise	Preferred	Mandatory
Customer base	Leverageable	Reference
Business knowledge	Required	Optional
Reputation	Media-based	Historic
<u>Business conditions</u>		
Lead generation	Field sales Advertising Trade shows	Commerce Business daily Federal budgets
Competitive bids	Optional	Required
Bid complexity	Variable	High
Expenditure commitment	Deferrable	Uncertain
Risk exposure	High	Contained
Contract type	Fixed price	Mostly fixed
Price restriction	Competitive	Ceilings
Bonuses	Occasionally	Award/incentive
Penalties	Occasionally	Exception
Profit potential	High	Limited %/high \$
Time to award	Business-driven	Procurement process

Then there are significant differences in the proportion of products and services required by the two sectors and the areas in which revenues are generated. Exhibit III-4 provides an outline of products and services in systems integration projects.

EXHIBIT III-4

## Products and Services in Systems Integration Programs

### Equipment

- Information systems
- Communications

### Software Products

- Systems software
- Applications software

### Professional Services

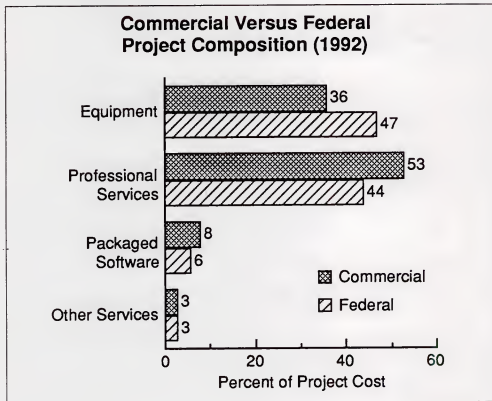
- Consulting
  - Feasibility and trade-off studies
  - Selection of equipment, networks, and software
- Program/project management
- Design/integration
  - Systems design
  - Installation of equipment, network, and software
  - Demonstration and testing
- Software development
  - Modification of software packages
  - Modification of existing software
  - Custom development of software
- Education/training and documentation
- Systems operations/maintenance

### Other Miscellaneous Products/Services

- Site preparation
- Data processing supplies
- Processing/network services
- Data/voice communication services

Exhibit III-5 elaborates on the differences in financial characteristics between the federal and commercial sectors, with regards to these items.

EXHIBIT III-5



Many of the vendors seeking to move from federal to commercial projects have recognized the differences and developed separate groups to address the two markets. Their approach until now appears to be one of leveraging advanced technologies developed through their federal government contract experience as an entrance into the commercial sector. Image processing has become a very popular focal point for many.

They face two problems in this effort. First, advanced technology has lost its appeal with many in the commercial sector. There is generally a low receptivity among buyers toward "experimentation." They want "tried and true" solutions that will have an immediate impact on specific business problems. Sophisticated, leading-edge image processing technologies have proven an especially hard sell in such a climate.

Second, commercial marketing groups in companies focused on the federal sector have frequently found themselves "orphaned" when the lure of a major, looming federal contract distracts senior management and the support they bring with them. The fact is that the federal government continues to offer significant contract opportunities in both the DoD and civilian sectors. For many federal vendors, it would probably be wise to adjust to the intensified competition in that sector rather than expend significant resources in the commercial area. Those that do intend to

make the transition should be prepared for a lengthy and uneven period of market development. This topic is addressed further in Chapter IV.

## B

### Market Factors and Projections

---

Despite many well publicized (and some not-so-well publicized) efforts, the SI market picture looks pretty much the same going into 1993 as it did in 1992. The federal sector is increasingly competitive but remains lucrative for those firms accustomed to working in that environment.

#### 1. Federal versus Commercial Projections

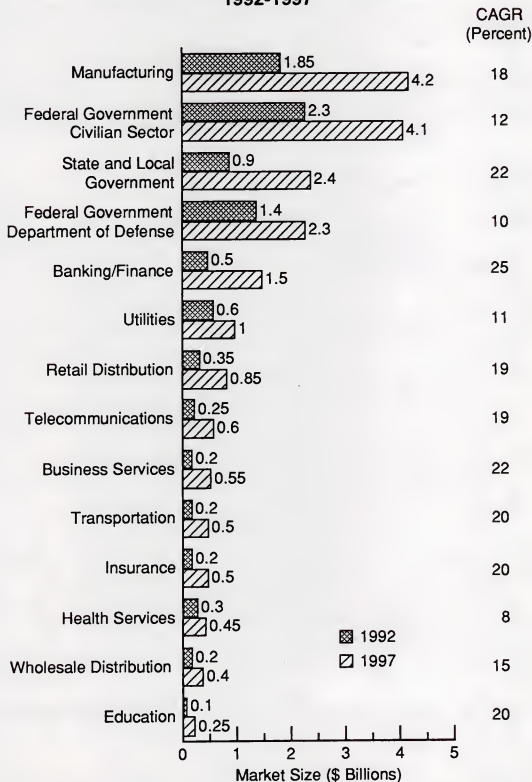
Large-scale federal contracts continue to be available and will be so into the foreseeable future. DoD has launched a major push for a corporate information management system (CIM) which should provide system integrators with many opportunities over the long term.

Civilian federal agency system integration project spending will reach \$4.2 billion by 1997. Many DoD vendors are eyeing a number of large, multi-year civil systems being implemented for the FAA, IRS, Military Reserve System, and Social Security System. Competition will be fierce and the usual vendor award protests will undoubtedly delay start dates.

As illustrated in Exhibit III-6, state and local government project spending will grow at a compound annual rate of 21%, reaching \$2.4 billion in spending by 1997, to equal the budget of DoD. Though INPUT classifies state and local government projects in its commercial forecast, this sector has enough in common with the federal sector to attract vendors seeking to make a smooth transition. In fact, some vendors have opted to work in state-funded manufacturing demonstration projects as an entrance to manufacturing sector business.

EXHIBIT III-6

### Market Sectors by Projected Growth 1992-1997



The commercial sector has clearly embraced SI. After just a few years of acceptance of the SI concept, commercial systems integration budgets will easily exceed federal spending over the next five years and so represent the most significant market opportunity. Profits in the commercial sector are higher than in federal projects, but as has already been pointed out, major differences in project characteristics pose a problem for federal project vendor specialists seeking to move onto the commercial side.

Commercial projects in general have always been smaller than federal projects. They are getting smaller still, as business seeks to reduce spending and realize a return on investment (ROI) faster. This factor increasingly opens the market to smaller vendors, making the commercial market even more competitive than the federal.

## 2. Key Commercial Factors

The positive and negative factors influencing the commercial systems integration market are outlined in Exhibit III-7. INPUT does not see the negative factors as significant enough to seriously slow market growth over the next decade.

EXHIBIT III-7

### Key Commercial SI Market Factors

#### Positive

- Downsizing/re-engineering
- Rising demand for connectivity
- Major rebuilding of infrastructure
- Growing user/client involvement
- Computer literacy
- Global competitive pressures
- Growing complexity of applications

#### Negative

- In-house competitive threat
- Poor economy
- System maintenance concerns
- Capital availability
- Organizational instability



Capital shortages and concerns over an anemic economic recovery are factors that can change rapidly. These are short-term factors. In fact, the backlog created by delayed projects will no doubt prove a boon to long-term prospects.

Organizational instability can serve to delay projects in the short term, but again should create a project backlog that will fuel growth in the long term. Further, mergers and acquisitions may actually serve to spur further growth, given the need to combine various platforms and operating systems in the aftermath of such activity.

The concerns about maintaining software programs developed by others is diminishing, as years of professional services experience and proven documentation techniques override them. Further, the steady increase in outsourcing and the blurring of the line between outsourcing and systems integration vendors will mean that the SI vendor will increasingly offer the outsourcing option in response to this concern.

The increasing sophistication of projects and diversity of skills required works against an in-house competitive threat. On the other hand, smaller projects may be viewed as more manageable, leaving this factor as something of a challenge, particularly when the maintenance of system control is favored over the outsourcing option.

On the positive side, downsizing, re-engineering, a rising demand for connectivity, and the consequent growing complexity of even small-scale projects work against in-house staff having the technical capability to deal with all the issues involved. Though an in-house staff can certainly act as a "contractor" on a project, hiring skills as necessary, the responsibility issue generally looms large enough to frighten off all but the boldest of IS managers. This issue will be discussed further in the next section.

Global competition is forcing business to think in terms of real-time mode, operating on a twenty-four hour basis, around the world. Information requirements no longer just pertain to product design and manufacturing but have finally reached the level of distribution and instantaneous customer feedback.

All of this is going to require a major rebuilding of infrastructure. On the one hand, the commercial sector is reluctant to make such a long-term investment. On the other hand, a growing computer literacy creates an appreciation for the value of such investment and competitive demands are likely to insure that they are made, sooner or later.

### 3. Key Federal Factors

As previously described, for all of the talk of budget cutting and "peace dividends," there are numerous influences that continue to make federal systems integration a highly desirable market. As increased reporting

requirements strain antiquated government systems, systems integrators will be in demand to redesign systems that once would simply have been replaced with more capacity. The kinds of problems and opportunities they will face are listed in Exhibit III-8.

## EXHIBIT III-8

**Key Federal SI Market Factors**Positive

- Productivity improvement demand
- Shortage of technical staff
- Trend toward technology upgrades
- Accountability
- Software integration
- Commercialization

Mixed Impacts

- Deficit and budgets
- Changing priorities
- More hardware/less professional services
- Fewer "mega"-contracts

Negative

- Extended implementation schedules
- Corporate information management initiative
- System maintenance
- Adversarial posture

General Services Administration (GSA) has argued that the larger an SI project becomes, the more unmanageable it is. Yet "mega"-contracts continue to be awarded because the concept of single vendor responsibility has proven as attractive to government as it is becoming to private industry. However, there is certainly a chance that, in view of GSA concern, some agencies will compromise with an overall "grand design" which will be implemented with a modular approach, dampening federal growth rates.

Budget constraints and the sudden changes in international political and economic circumstances will no doubt drive some delays in SI projects. But a still greater cause of delay will likely be the protests registered by losing bidders, particularly on major projects.

Overall, however, new hardware technologies and the next generation of software will be necessary if government is to meet the reporting role demanded of it. The demand for communication between incompatible equipment is a fact of life and agencies are increasingly required to merge large applications into a single, transparent system that fits users' needs. The market for SI services is simply not going to go away.

## C

### Buyer Issues/Vendor Challenges

Chief Information Officers are increasingly losing budgetary control and even planning control over new systems. They are being assigned the role of designing the infrastructure and managing the technology investment, while users define their project needs and the source of supply to satisfy them. The CIO may well act as a consultant, but final spending authority will increasingly rest with the user.

SI vendors must keep this shift in mind if they expect to be successful in this brave new world.

#### 1. Buyer Issues

There is a great deal of value in repeating the chart contained in the previous chapter relating to major buyer/user issues (see Exhibit III-9). It must be kept in mind however, that concerns will vary dramatically from sector to sector, as well as within each sector.

EXHIBIT III-9

#### Major Buyer/User Issues

- Competitive demands force core business focus
- Internal control versus inadequate skills
- Users become buyers
- Increasingly complex technology demands
- Full service/liability demands on SI vendors
- Smaller projects, faster results

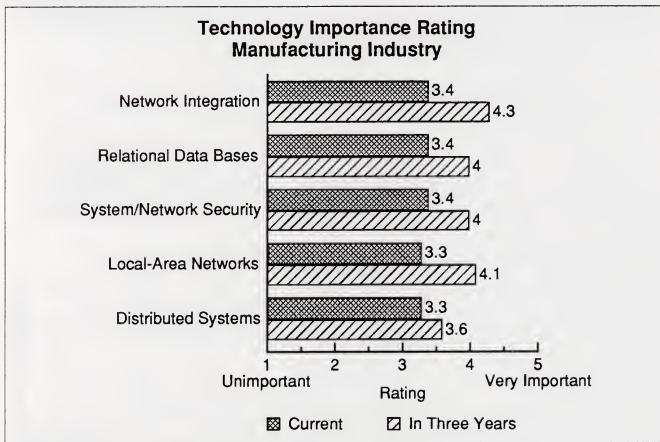
While all of the factors listed will likely be of concern to one degree or another, emphasis can differ markedly not only from company to company, but from division to division, and even from department to department within a given company. The shift from a centralized CIO buyer to a multitude of users presents a good many challenges and an equally large number of opportunities.

It is undoubtedly this dilution of buying authority which is driving an increased demand for business and process consulting from SI vendors. There is an increasing need to define the "what" before the "how."

Users may be more technically sophisticated than in the past, but that does not make them the equivalent of a CIO. Consequently, there will typically be a number of contradictions to be resolved for vendors.

For instance, Exhibit III-10 is a manufacturer's response to an INPUT survey asking for a rating of technology in its industry. The contradictions are both interesting and revealing.

EXHIBIT III-10



The most obvious factor is the increasing importance of network integration over a three-year period. However, given the *immediate* focus of buyers, where does the SI vendor place emphasis?

Distributed systems are given a rather modest importance rating. Yet distributed systems have been an integral part of manufacturing process control for the past twenty years!

The caution for vendors in this rather basic example is the problem of identifying what buyers think they need versus what their requirements list actually indicates they need. The reconciliation of the two lists is an interesting process.

The other major factor of concern to SI vendors is the requirements of buyers driving sophisticated technology solutions versus their suspicion of the very technology they may require.

A case in point is network protocol for linking disparate systems. In the main, customers are demonstrating a marked preference for the older TCP/IP (Transaction Control Protocol/Internet Protocol) over the newer OSI (Open Systems Interconnection) that promises an international standard for linking different types of computers and networks to a mainframe host.

"Open standards" may be in fashion, but its a classic "chicken or egg" problem. Users want to know that there are many successful OSI applications out there before they commit.

Vendors are likely to find many such contradictions as they increasingly deal with user/buyers.

## 2. Vendor Challenges

A more detailed description of vendor marketing and project management issues will be presented in Chapter IV. But the issues are pressing enough that a preview of marketing concerns is worthwhile. Exhibit III-11 outlines some of the considerations that vendors face, at least in the commercial sector, as users increasingly become buyers.

EXHIBIT III-11

### Vendor Challenges Prospecting and Selling

- Identification of prospects
- Identification of multiple buying influences
- Unifying disparate requirements
- Proposal/bid preparation addressing these multiple elements and varying levels of sophistication

Unlike the federal process, locating potential projects, particularly as they become smaller, will represent a significant task for SI vendors. In many cases, prospects will not even be aware that they require SI vendors. Their initial starting point may well be hardware vendors or software suppliers with whom they are already dealing.

Advertising, as well as trade shows, must both become a more significant factor for SI vendors. The approach must be one that manufacturers have used for years: an educational approach which clearly positions the SI vendor in the minds of prospects.

Once identified, SI vendors are going to have to be aware of multiple and often disparate buying influences, with varying degrees of technical sophistication. Those various elements will have to be addressed throughout the selling process, right through to the formal submission of the proposal.

The process can be very expensive, requiring significant amounts of time on the part of highly paid personnel. Hence, vendors are going to have to develop routine approaches that contain selling costs in anticipation of the problem.



## Vendor Profiles

(Blank)



## COMPANY PROFILE

---

American  
Management Systems  
(AMS)

### 1. Key SI Contacts

Charles O. Rossotti  
Chairman  
1777 North Kent Street  
Arlington, VA 22209  
(703) 841-6000

#### Commercial

Patrick Gross  
Vice Chairman  
1777 North Kent Street  
Arlington, VA 22209  
(703) 841-6000

#### Federal

Paul Brands  
Executive Vice President  
1777 North Kent Street  
Arlington, VA 22209  
(703) 841-6000

### 2. Description of Principal Business

American Management Systems (AMS) is a \$200 million systems integrator which offers a full set of products and services to its targeted market. See Exhibit AMS-1.

## EXHIBIT AMS-1

**AMS Offerings by Market**

Offerings	Financial Services	Federal/ Aerospace	State/Local Universities	Telecommu- nication	Energy	Other Industries
Software Products	X	X	X	X	X	
Professional Services	X	X	X	X	X	X
Processing Services/ System Operations	X	X	X			X

AMS has been a pioneer in several ways:

- AMS successfully offers a combination of packaged software and services aimed at specific markets; many other companies have tried and failed in offering such a combination.
- AMS has used this approach successfully for over ten years in both the government and nongovernment markets. Many of AMS' federal market competitors have not been successful in the commercial market.

AMS has over 2,700 employees and has offices in more than 20 cities in the U.S. and Canada.

### 3. Competitive Position

AMS' principal achievement has been its ability to build businesses with good growth rates across five market areas, as shown in Exhibit AMS-2. This positioning across widely different sectors will prove especially important over the next few years as expected cuts in defense spending take place. AMS should be able to redeploy its assets more readily than many of its military systems integration (SI) competitors.

## EXHIBIT AMS-2

**AMS Markets: Size and Growth**

Market	1988 Revenues		Revenue Growth 1987-1988 (Percent)
	\$ Million	Percent	
Federal/Aerospace	62.0	35.4	20
Financial Services	37.2	21.3	17
State/Local Governments and Universities	32.1	18.3	17
Telecommunications	11.2	6.4	64
Energy Industry	9.1	5.2	55
Other Industries	23.4	13.4	9
Total Revenues	175.0	100.0	21
Reimbursed Expenses	38.3		
Grand Total	213.3		

AMS' estimated systems integration revenues are shown in Exhibit AMS-3.

## EXHIBIT AMS-3

**AMS 1989 Systems Integration Revenues**

Business Component	\$ Millions
Federal	15
Commercial	125

A related strength is AMS' special relationship with IBM. This will be described and analyzed in Section 5, below.

AMS has "proceduralized" much of its knowledge of specific markets into software packages. This often enables AMS to offer a combination of packaged and customized services to clients. This approach, when it works as intended, can offer the customer a high-quality system that meets specific customer requirements, at a lower cost and a faster implementation time than competitors that offer only packaged software or only customized solutions.

AMS is bound to have some problems with its federal defense business over the next few years, as programs are stretched out and cut back. Even though AMS' federal business only accounts for about one-third and its defense business for about 15% of AMS' overall revenues, the uncertainties associated with these businesses could still create management and financial problems for AMS.

A larger issue is whether AMS has the project and financial skills to achieve a significant level of profitability in its SI business. In principle, AMS should be quite profitable:

- Two-thirds of its business is already in the commercial market; most of that is in specialized vertical markets.
- One-third of its business is in software products, which usually have higher margins.
- Its professional services are largely aimed at more specialized and value-added areas, rather than at the lower margin "commodity" business.

However, AMS' operating margins (6-8% range) and net margins (3-4% range) look much more like that of a relatively undifferentiated professional services firm (or provider of federal government services). See Exhibit AMS-4. This raises questions as to whether changes in its management approach may not be necessary in order to bring AMS' financial returns in line with its successful growth and record of technical achievement.

## EXHIBIT AMS-4

**AMS Margins**

Margins	1988	1987	1986	1985
Operating (Percent)	5.2	7.7	7.6	5.8
Net	3.5	4.3	3.9	2.9

**4. Markets Served**

AMS targets five principal markets:

- Federal
- Financial Services
- State and Local Government
- Telecommunications
- Energy

The subsectors that AMS targets are shown in Exhibit AMS-5. AMS' business is almost wholly focused in the U.S., with less than 5% from Canada and negligible amounts from other foreign sources.

## EXHIBIT AMS-5

**AMS Submarkets****Financial Services**

- Commercial banks
- Thrift institutions
- Finance companies
- Investment banks and securities firms
- Insurance companies
- Diversified financial companies

**Defense**

- Military services
- Defense agencies
- Aerospace prime contractors

**Civilian Federal Agencies****State, Local, and Other Governments**

- States and state agencies and Canadian provincial governments
- Cities
- Counties
- School districts
- Canadian government ministries

**Colleges and Universities**

- Universities
- Four-year colleges
- Medical centers
- Community colleges

**Telecommunications**

- Local telephone companies
- Long distance and international carriers
- Information services providers

**Energy Companies****Major Companies in Other Industries**

- Retail
- Distribution
- Consumer products

## 5. Recent Events

The most important recent event—in fact, one of the most important events since AMS' founding in 1970—was IBM's purchase of 10% of AMS' equity for \$18 million, in July 1989.

This investment was part of the IBM's 1989 web of strategic investments in vertical market and implementation firms in the information services industry, including:

- Computer Task Group
- MSA (now part of D&B)
- Policy Management Systems

In these investments, IBM has had a number of motivations:

- To tighten its links with SI partners in selected vertical markets
- To make sure that key providers of IBM mainframe solutions do not come under the control of parties hostile to IBM
- To accelerate the implementation of SAA in key application areas
- To add to the product development capabilities (both financial and technical) of its key partners

In the case of AMS, all of these IBM objectives played a role in IBM's decision.

What advantages does this investment have for AMS? The most prominent advantages for AMS include:

- Cooperative marketing with IBM selling AMS products and services
- IBM's "stamp of approval," which is still important for many large customers
- A multiyear service contract to assist IBM in software product development
- The potential for AMS to migrate its business even faster from the federal to the commercial sector
- Making an unfriendly takeover of AMS more difficult
- IBM's technical cooperation (and advance information) on improving the technical aspects of AMS' offerings (e.g., embedding CASE tools, increased DB2 efficiency, distributed data bases, and processing)

## 6. SI Organization

AMS' organizational structure is a complex, matrixed structure, made up of a combination of geographical, functional, vertical, and project factors. For example, AMS has 45 people with the title of Vice President. The largest differences in organization are between the federal and commercial sides of the business; the commercial side is far more decentralized, as shown in Exhibit AMS-6.

EXHIBIT AMS-6

### AMS Organization—Centralization & Decentralization by Line of Business

Task	Commercial		Federal	
	Cent.	Decent.	Cent.	Decent.
Strategy & Long-Range Planning		X	X	
Marketing & Promotion		X	X	X
Account Management/Sales		X		X
Contract Review/Approval	X	X	X	
Project Management/Control		X		X
Implementation/Development		X		X
Hardware/Software Acquisition	X	X	X	
Systems Operations		X		X

AMS has several subsidiaries in addition to its core organizations, including:

- AMS Management Systems Canada; this group has its own subsidiary, Loecus Informatics (a 1988 acquisition).
- AMS Technical Systems, designed to compete and manage long-term defense contracts
- Data Base Management Inc. (acquired in 1986); DBMI has its own subsidiary, The Courseware Developers. Both these subsidiaries provide consulting and education services.



## **7. SI Business Objectives**

AMS' business objectives are to meet the total information systems needs of its clients. To do this, AMS will provide packaged software, semi-customized software, custom software, consulting, systems integration services, and systems operation services.

Being a public company whose entire business is centered around the segments described here, AMS must make the SI business (broadly defined) as profitable as possible.

## **8. Internal SI Capabilities Evaluation**

### **a. Business Consulting**

AMS offers the following types of business consulting services:

- Planning information systems (IS) applications
- Improving business (or government) operations with computer systems technology

Generally speaking, AMS only performs business consulting that has an involvement with information services.

### **b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation**

AMS has its own Lifecycle Productivity System (LPS) used to develop custom projects for clients. LPS is made up of a combination of third-party software and its own AMS-developed software. LPS handles all phases of the life cycle.

Part of LPS is the "CORE Foundation Software" of reusable application code modules. This helps AMS automate and control the content as well as the form of its custom applications.

### **c. Packaged Application Software**

AMS has extensive offerings of applications software, divided into the following families of software products:

- Consumer credit management systems
- Corporate and international banking systems
- Federal financial systems
- State and local government management systems
- College and university management systems

- Energy industry management systems
- Telecommunications industry management systems

As noted earlier, these application software products can be customized using AMS' own proprietary techniques.

#### **d. Packaged Systems Software**

AMS does not offer its own packaged systems software. However, as part of AMS' timesharing services—offered mainly to the federal sector—AMS does offer third-party products for use by its customers (e.g., graphics utilities and DBMS).

#### **e. Standard Computer Hardware**

AMS does not sell hardware.

#### **f. Custom Computer Hardware**

AMS does not develop custom computer hardware.

#### **g. Network Management and Operations**

AMS becomes involved in network management and operations in three primary ways:

- Through its own network, used to support its timesharing services
- Through applications that AMS has developed and subsequently operates. BureauLink is the best example of this: AMS serves as a neutral third party that manages communications and the exchange of information between the major North American credit bureaus.
- Through its products and services offered to the telecommunications industry. (See Section 4 for types of AMS customers in this segment.)

AMS, of course, develops many on-line and networked applications for its targeted customer groups.

#### **h. Service and Repair**

AMS has no significant service or repair offerings.

#### **i. Software Maintenance**

AMS has significant business in maintaining its own software products and delivered systems. In its federal business, it also maintains software written by the customer or by other contractors.

## 9. SI Strategic Alliances

Looking into the future, the IBM alliance is AMS' principal alliance (see Section 5). In the past, AMS has teamed with a number of major contractors for specific jobs; such business partners have included GTE, McDonnell Douglas, Westinghouse, and General Dynamics. AMS has generally been a subcontractor in such relationships. INPUT expects such prime/sub relationships to continue, especially where the other partner is not a direct competitor to IBM. However, as discussed earlier, the federal business will become less important to AMS over the next several years.

AMS recently entered into a joint venture with Bell Atlantic called Bell Atlantic Systems Integration. This joint venture provides Bell Atlantic's three thousand account executives with a systems integration offering that addresses opportunities requiring information processing as well as telephone products and services.

## 10. SI Capabilities Summary

AMS is rich in SI capabilities:

- It is established in a number of key markets (see Exhibits AMS-1 and AMS-2).
- AMS has a proven capability of offering the full range of services needed to cover a client's SI needs.
- AMS has a good track record in implementing complex systems.

## 11. Marketing Strategy

INPUT expects to see both IBM and AMS benefit from their partnering strategy. AMS, especially, should find that doors are now open to it that were closed before.

Even without IBM, AMS is quite well positioned. Almost half of AMS' substantial commercial business comes from its existing client base.

AMS competes with—and often cooperates with—most of the leading federal SI players; AMS often competes as a member of a team. In the commercial sector, Andersen Consulting and, to a lesser degree, the other major accounting firms are competitors.

Because of AMS' vertical orientation, it competes against other specialists:

- Firms such as Systems and Computer Technology that offer a full service approach to a particular need
- Software product firms such as Hogan or Computer Associates

## 12. SI Customer Base

AMS has a solid SI customer base. It has an important role in several large federal SI projects:

- Veterans Administration—Document and Imaging System
- U.S. Navy Paperless Ship—Shipboard Optical Disk Applications
- Department of the Interior—Minerals Management Service
- U.S. Navy—Naval Industrial Improvement Project

Although AMS indicates that it has participated in over 50 commercial SI projects since the beginning of 1987, its focus appears to have been more on providing professional services and tailored software than on being a prime contractor providing complete, integrated solutions. It has, however, increased its focus on commercial systems integration and will pursue a modest number of large SI projects.

## 13. Summary and Future Direction

AMS is one of the better-positioned SI companies, especially in commercial SI. This was no doubt a very important consideration in IBM's investment in AMS. INPUT expects to see AMS—in conjunction with IBM—mine its commercial sectors even more intensively in the future. AMS' balanced capabilities in software products, professional services, processing services, and systems operation make AMS nearly unique. (Policy Management Systems, another IBM investment, is one of the few similarly positioned companies.)

## COMPANY PROFILE

---

Ameritech  
Information Systems  
(AIS)

### 1. Key SI Contacts

Charles Zito  
Vice President and General Manager  
Systems Operations  
Ameritech Information Systems  
Suite 1700  
500 West Madison  
Chicago, IL 60606

### 2. Description of Principal Business

Ameritech is one of the leading providers of telecommunications services. Created as a part of the AT&T breakup, Ameritech's primary source of revenue is the provision of telephone and data services throughout the north central part of the United States.

Ameritech Information Systems (AIS) is an unregulated, independent division, of Ameritech Corporation. AIS has been providing systems integration services for three years to the commercial sector. No work is currently done in the federal market, although Ameritech is regularly evaluating that potential.

### 3. Ameritech Competitive Position

The company has developed a number of products and capabilities that provide a competitive advantage in its market areas. The following were specifically identified:

- CASE - Design methodology
- Industry Specific Software - Clinical data base system and a common user interface for the Windows environment.
- Industry Specific Software - Integrated library system for patron and staff use.
- Connectivity Products - Network operating systems, Fax gateway, and scheduling systems.
- Connectivity Products - LAN design, development, implementation, and operation tools and procedures.
- Hardware/Software Systems - Cross-industry application

- Project Management Processes - Methodology applicable to all project types.
- Network Management Products - SNMP LAN manager. Automated Control of Evidence System - System to control evidence and auction management of property.
- Computer Aided Dispatch System
- Electronic Data Interchange Products and Services

Exhibit AIS-1 identifies the organizations that AIS considers its most significant competitors in systems integration.

EXHIBIT AIS-1

### Key SI Competitors

<i>Commercial</i>	<i>Federal</i>
Andersen	Andersen
EDS	EDS
Oracle	Deloitte Touche
IBM	

#### 4. Market Served

Like many vendors, AIS has selected a number of vertical industries as their key areas of concentration. The markets have been selected primarily on the basis of the requirements of existing clients. Key markets include:

- Healthcare
- Libraries
- Education
- State/Local Government (Public Safety)
- Finance

In addition to the vertical market concentration, AIS has identified a number of cross-industry applications.

- Local area networks
- Network management
- Electronic data interchange
- Customer support systems
- Imaging systems
- Videoconferencing
- Proprietary/open systems integration
- Client/server architecture planning and development

## 5. Recent Events

AIS acquired Knowledge Data Systems of Salt Lake City, Utah on January 31, 1991 for \$26 million. Knowledge Data Systems provides integrated, multi-application data processing systems and related services to health care institutions and independent medical laboratories throughout the United States.

Another recent acquisition by AIS was for NOTIS Systems, Inc. of Evanston, Illinois on October 1, 1991. NOTIS is a provider of academic library information software systems. NOTIS customers include large libraries and research institutions such as the University of Michigan and Indiana University, as well as public and corporate libraries.

Knowledge Data Systems and NOTIS Systems, Inc. will play a major role in AIS' existing efforts to further expand into the health care and library marketplaces.

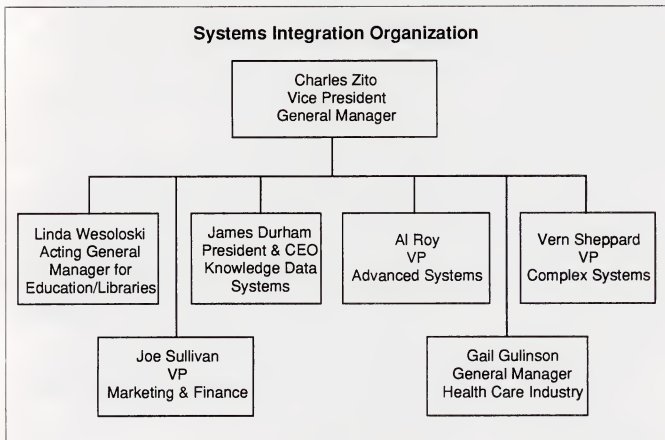
## 6. Ameritech Organization

The organization is a mix of centralized and decentralized function. Planning and promotion are performed both centrally and through field staff. Hardware and software acquisition and administrative functions are performed centrally. All other activities are performed by field staff.

The company currently has 250 full time staff assigned to systems integration. Of the total, 65% are assigned to systems development, including project management and implementation activities. Fifteen percent are dedicated to sales activities and 10% are dedicated each to management and administrative activities.

Exhibit AIS-2 provides a summary of key organizational units within AIS.

EXHIBIT AIS-2



## 7. SI Objectives and Revenues

Ameritech derives 90% of its systems integration revenues as a prime contractor. The other 10% is derived by supporting client managed projects. Fifty percent of their revenue is from their existing client base and 50% is from new clients. All current revenues are derived from the commercial market.

The company reports that profit margins are stable. The greatest margins are realized on custom software development and the lowest are realized on hardware and software. All others result in margins that would be considered average.

Ameritech expects that its systems integration revenues will grow at an annual rate of over 50% for at least the next three years.



## 8. Internal SI Capabilities Evaluation

Ameritech believes that they currently have internal capabilities to perform most activities associated with systems integration. They place high value on expertise related to systems design and development, and management of large projects. They report that they have no alliances for these activities. However, they do have alliances to support customer needs for hardware, packaged application and system software, and activities such as maintenance.

## 9. SI Strategic Alliances

The company has informal, rather than formal, alliances. The primary purpose of AIS' alliances is to support joint development efforts when the vendor has a unique platform to meet a customer's needs. Their alliance program also provides a basis for technology transfer and for future planning.

Alliances are both short- and long-term. Key alliances include the following:

- Sigma Imaging Systems - Imaging Platform
- SpectraFax Corp. - Special request technology
- NedAdvice - Network design and consulting
- TELLABS - Technical information exchange
- US Sprint - Interexchange carrier services
- Unisys - Hardware/software
- IBM - Hardware/software
- DEC - Hardware/software
- ACD - Hardware/software
- Westinghouse - Unspecified

## 10. SI Marketing Strategy

As with most integrators, AIS derives the majority of its opportunities by leveraging work with existing clients (75%). Twenty five percent is derived from responses to proposal request.

The company does little public advertising. AIS conducts seminars and does direct mail advertising. They also participate in trade shows. Like many vendors in systems integration, particularly those in the commercial market, they place a great deal of emphasis on client reference.

## 11. SI Customer Base

Ameritech's customer base is from the commercial market exclusively. The company has no federal clients and has not expressed strong interest in entering the federal market.

The report that contract values vary considerably, but are generally in the range of \$500,000 to \$1 million each. The value of contracts is increasing and the trend is expected to continue. The company reports that 40% of the value of contracts is for professional services. Thirty percent is for equipment and packages software respectively.

Ameritech's contracts reflect the industry trend to greater distribution of system activities. The company reports that 80% of their project revenues are for distributed systems. Only 20% are for mainframe based systems.

The company reports the following systems integration projects as examples.

- Roberts Express - Implement the migration of existing system to new, open, system environment supporting customer service, trucking and highway dispatch, two-way satellite communications and a number of administrative system processes.
- MECA - Implementation of a public safety and public service communications system in a multi-agency and multi-jurisdictional environment.
- IUPUI (Indiana University/Purdue University at Indianapolis) - Develop and provide a new library information system. System provides implementation plan to permit library to serve as focal point for application, demonstration, and development of present and emerging integrated technologies and information delivery.
- Chicago Transit Authority - Project to develop a metropolitan area network supporting voice, data, and video needs of the Authority's offices, rail terminals, rail stations, bus garages, and maintenance shops. Provides extensive reporting about fares and operating performance.
- SC Johnson - Develop systems architecture incorporating electronic imaging to support decentralized, financial management system.

## 12. Summary and Future Directions

Ameritech Information Systems has made a good start at entering the systems integration market. It has chosen to enter by acquisition of *niche* companies, permitting it to provide integration services in such special areas as library services and the high-potential health services area.

These capabilities, coupled with the communications integration capabilities that Ameritech has inherent in its organization, should make it attractive as an integration option for users in these areas. Both of these markets could lead to entry into the state and local arena and the insurance industry, if early successes give it the proper credentials it needs.

Ameritech's early systems integration strategy seems suited to its current market position. This should provide it the potential for market growth in the upcoming year.



## COMPANY PROFILE

---

### Andersen Consulting

#### 1. Key SI Contacts

John T. Kelly  
Managing Partner  
Andersen Consulting—Americas Region  
901 Main Street, Suite 5400  
Dallas, TX 75202  
(214) 741-8400

Donald P. Monaco  
Managing Partner  
Integration Services & Technology—Americas  
33 West Monroe Street  
Chicago, IL 60603  
(312) 580-0033

#### 2. Description of Principal Business

Andersen Consulting provides technology and management consulting services to clients in nearly every business and government sector. Andersen helps its clients change themselves to be more competitive by linking their strategy, processes, people, and technology. In September 1989, Andersen Consulting assumed the operations, activities, and personnel of the former Management Information Consulting practice of Arthur Andersen, which provides accounting, audit, and tax services. Andersen Consulting now operates as a separate legal entity.

A breakdown of Andersen Consulting's services is as follows:

- Strategic Services
- Systems Integration
- Change Management Services
- Business Process Management

Andersen Consulting (AC) has offered management consulting services since 1948, and information services-related consulting since the early 1950s. Andersen Consulting derived \$2.3 billion of revenue from consulting services in fiscal year 1991.

Of Andersen Consulting's revenue, approximately 30% can be attributed to pure professional services contracts, 65% to systems integration (SI), and the remaining 5% to applications and systems software products. INPUT's estimate of the detailed breakdown is contained in Exhibit AC-1.

In the past Andersen did not directly supply any equipment or systems software products for an SI engagement. Although this has changed somewhat, INPUT estimates that the SI revenue amount would be about 30% higher if Andersen provided all of the SI-related equipment.

## EXHIBIT AC-1

**Key Parameters of Andersen Consulting's Consulting/SI Business**

Parameter	U.S. (\$M)	Total (\$M)
IS practice revenues (1)	1,090	2,267
IS practice personnel	10,070	21,668
Systems integration revenue (1), (2)	745	1,045

(1) Fiscal year August 31, 1990, to August 31, 1991

(2) Calculated by INPUT

Andersen Consulting has been one of the most phenomenally successful knowledge-related businesses of the last 20 years. Revered at one moment by its competitors in the information services marketplace, and not taken seriously at others, the consulting operation has consistently shown significant growth rates and defeated the competition on a regular basis. Its commitment to the information services market has resulted in significant developments over the past several years.

**3. Andersen Consulting Competitive Position**

Andersen's estimated \$1,090 million revenue in information systems (IS) consulting makes it the leader among the Big 6.

Andersen Consulting's strengths include contacts at the senior executive level at customer companies. Each IS partner is expected to contact senior officers at their top accounts. In addition, Andersen Consulting offers extensive in-house staff training and has a strong services-oriented culture. AC has developed a variety of strong third-party hardware and software vendor relationships to support it in its information services consulting business.

INPUT does not believe that AC has any significant weaknesses. However, some problems do exist. First, AC's partnership culture has traditionally worked against change. The vertical industry focus facilitates successful SI programs but places an excessive travel burden on the specialist partners. Recent developments within the organization are likely to minimize the effect of this problem. Second, AC's approach to systems integration has been heavily business-process-oriented. Top-down in nature, the approach is not suitable for every client. Finally, AC's strengths in the international component of the IS/SI market have significantly lagged behind the U.S. operations. However, AC is rapidly building these capabilities. In recent years, Andersen's growth in non-U.S. market has been two to three times the growth in the U.S. market. Exhibit AC-2 summarizes INPUT's assessment of Andersen Consulting's competitive strengths and weaknesses as they apply to the systems integration business.

EXHIBIT AC-2

**Andersen Consulting's Competitive Status**

SI Strengths	SI Weaknesses
Total Solution	
High-level client contacts	Partnership culture
In-house training capability	Reliance on methodology
"Professional services culture"	
Strong third-party relationships	

**4. Markets Served**

Andersen Consulting's U.S. systems integration business focuses almost exclusively on vertical markets, but in effect covers almost all of the commercial and government sectors, including

- State and local government
- Discrete manufacturing
- Wholesale and retail distribution
- Financial services
- Health care
- Insurance
- Utilities
- Process manufacturing
- Transportation
- Telecommunications
- Energy and gas
- Federal government

Although AC has clearly demonstrated capability in all the markets listed above, from a historical perspective INPUT believes that AC's primary focus in these vertical industries in order of importance has been as follows: manufacturing, distribution, state and local government, financial services, and telecommunications.

Furthermore, although many competitors consider Andersen Consulting "invisible" in the federal SI marketplace, AC has placed emphasis on developing business in that arena. But, compared to the other leading SI vendors, Andersen has been less successful in developing this market segment. The SI vendors with hardware and aerospace background have a competitive advantage in this market.

## 5. Recent Events

A number of significant events have impacted Andersen Consulting's position in the SI market over the past three years.

- AC has placed significant emphasis on the development of alliances in the software community, including Oracle, PeopleSoft, Coda, QSP, Lotus, SAP (West German cross-industry financial packages), and many others. Hardware alliances have been formed with IBM, Digital, Hewlett-Packard (H-P), Sun Microsystems, and Tandem.
- AC has focused on the development and aggressive marketing of its own software products, including FOUNDATION (integrated full life cycle CASE tool set); DCS/Logistics (Distribution Control System); the "MAC-PAC" line of integrated manufacturing software; and PROCESS/1, an open software solution for the process industry.
- Andersen Consulting made a number of acquisitions during 1989.

Acquisitions include the following:

- In September 1989, Andersen Consulting acquired Rossmore Warwick, a 25-to-30-person British engineering firm that helps design new factories and new process lines.
- In July 1989, Andersen Consulting acquired Courseware, Inc. of San Diego, CA. Terms of the acquisition were not disclosed.
  - Courseware provides computer-based training and training support services to clients in insurance, data processing, communications, real estate, defense, aerospace, and travel, as well as state and federal government. The company had 60 employees at the time of the acquisition and 1988 gross fees of \$5.2 million.



- The operations of Courseware have been merged into Andersen Consulting's Change Management Services (CMS) practice.
- In January 1989, Andersen Consulting acquired McCormack & Dodge PIOS manufacturing resource planning system. This product and the related employees have been merged into the Application Product Group.
- Other 1989 acquisitions include
  - Computer Management Associates, a consulting firm in Oslo (Norway)
  - Synerlogic, a Canadian consulting firm
  - CMC Consultores, a Spanish consulting firm

INPUT is not aware of further acquisition activity by Andersen since 1989.

As discussed earlier (Section 2), the formation of Andersen Consulting represented an important change in the firm's outlook on the consulting/IS/SI business.

Andersen's growth has not been painless. A number of key systems integration management personnel have left to start new companies or strengthen competitors.

In 1988, several senior partners departed Andersen Consulting to form another firm, Information Consulting Group, financed by Saatchi and Saatchi. This venture was not successful, and has since been purchased by McKinsey and Co.

In 1989, Mel Bergstein, a senior Andersen Consulting partner, joined Computer Sciences Corporation (CSC) and became Senior Vice President of systems integration. Two additional key partners joined him at CSC. Mr. Bergstein has since left CSC and joined TSC.

In June of 1991, the worldwide managing partner of Integration Services, Mr. John Oltman, joined SHL Systemhouse as chairman and CEO. Mr. James Burns, who was also worldwide head of SI before going to Goldman Sachs, has also joined Systemhouse. Other senior level defections to Systemhouse include Robert Boyd, David Larson, Kevin Rowe, Henry Burgess, Daniel Carter, James Bernstein, John Bunnell, Philip York, Gary James, and William DeVitt.

Due to the recognized high quality of Andersen's SI partners and program managers, they will always be targets for other company's recruiting efforts.

In July 1990, the Securities and Exchange Commission ruled that Andersen Consulting could partner with the Arthur Andersen's audit clients. This permits the firm to establish alliances with audit clients such as Oracle and Amdahl. Andersen can also now enter SI engagements with audit clients.

Exhibit AC-3 summarizes major recent events impacting Andersen Consulting's position in the SI marketplace.

**EXHIBIT AC-3****Andersen Consulting—Major Recent Developments**

- Extensive formation of application software alliances
- Aggressive formation of hardware and systems software alliances
- Development/promotion of internally developed software
- Reorganization to support SI/IS business

**6. Organization**

Andersen Consulting manages and delivers its services through the matrixed structure depicted in Exhibit AC-4. The organization is headed by Mr. George Shaheen. Reporting to him are managing partners with operational responsibility for three major geographic areas: the Americas, EMEAI (Europe, Middle East, Africa, and India), and the Asia and Pacific area. These partners have responsibility for delivering all of AC's services to their clients.

Market Development is responsible for Andersen Consulting's image, industry practices, and most recently, strategic services and change management services service lines. Six key industry practices are assigned managing partners who are responsible for setting the strategic direction and building the industry practice. Those industries are

- Financial services (includes insurance, financial markets, and retail financial services)
- Government
- Healthcare

- Products (includes discrete and process manufacturing, aerospace and defense, and retail and wholesale distribution)
- Telecommunications
- Utilities

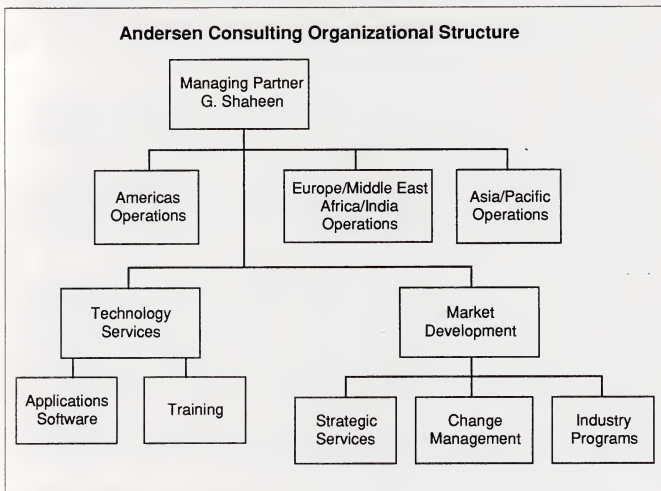
Strategic Services assists clients in forming and managing their strategic planning processes. Included are services that analyze the client's market-place and competitive position, identify strategic alternatives, establish a formal direction, and monitor the execution of strategies.

The Change Management Services practice works with organizations to manage all elements of change. These services focus on organizational structure, knowledge transfer, and the assimilation of technology and people.

Systems Integration includes the full range of development and integration activities. Business Process Management includes facilities management, data center and network operations, and remote processing. In Andersen Consulting's Americas region, Systems Integration and Business Process Management are part of the organization's Integration Services and Technology (IS&T) organization. IS&T also includes Andersen Consulting's Business Integration Partnership alliance management program and distributed technology groups.

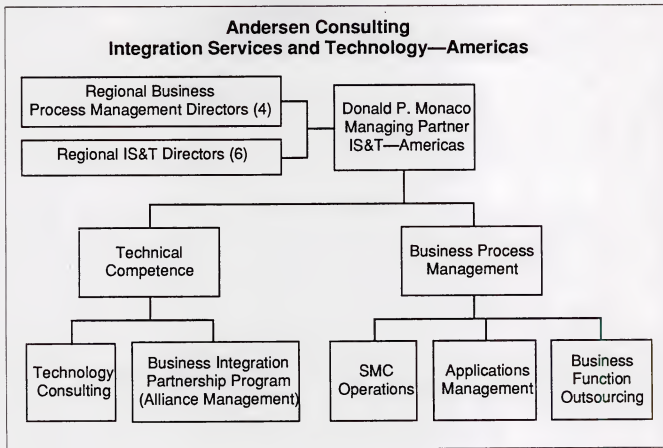
Additional areas that report to Mr. Shaheen include Technology Services, which is responsible for technical excellence (including products such as FOUNDATION).

## EXHIBIT AC-4



Andersen Consulting utilizes a highly matrixed organizational structure. In the Americas the entire Integration Services and Technology practice is the responsibility of Mr. Donald P. Monaco. Six key industries are assigned managing partners: financial services (includes insurance), health care, products (includes manufacturing and distribution), utilities, telecommunications, and government (includes federal, state, and local). There are also six Integration Services and Technology regional directors. Exhibit AC-5 shows Andersen Consulting's Integration Services and technology organizational structure for the Americas.

EXHIBIT AC-5



Based on INPUT's interviews with Andersen Consulting, responsibilities are distributed in accordance with Exhibit AC-6, which compares how major responsibilities are managed within the commercial and federal organizations, respectively. A "C" indicates that the responsibility for the activity in question is primarily centralized, a "D" means decentralized, and a "B" indicates that the responsibility is shared by both.

Centralized groups handle marketing, risk management assessment insurance, national contract purchasing, and other activities. Regional offices provide the emphasis and most of the technical professionals necessary for systems integration projects.

## EXHIBIT AC-6

### Centralization/Decentralization of SI Business Function Andersen Consulting

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	C
Marketing and promotion	B	C
Account management/sales	D	D
Contract review/approval	B	C
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operations (if applicable)	D	D

C = Centralized, D = Decentralized, B = Both

Andersen Consulting has established a number of systems management, advanced technology, and business integration centers to support its activities.

- Andersen Consulting currently has five sites for its business integration centers, which specialize in industry- and function-specific technology. These centers serve as facilities where industry project teams from around the world build and demonstrate visions of the future through full-scale working technology exhibits (e.g., a factory floor or hospital of the future). These demonstration centers are continuously updated and enable clients to visualize how leading edge technologies can be integrated into their own business environments.
- Business integration centers are located in Chicago, Dallas, and Atlanta.

- SMART STORE 2000, located in Chicago, is a showcase of Andersen Consulting's vision for the food pipeline process through the retailer. The exhibit incorporates state-of-the-art hardware and software applied by more than 40 participating vendors and addresses food industry management concerns about the future.
- Andersen's LOGISTICS/2000 exhibit in Atlanta demonstrates how the integration of technology can benefit a logistics organization. It includes an automated warehouse and offices for sales and customer service, inventory management, transportation management, and executive management.
- Also in Atlanta, PROCESS 2000 focuses on the operation of an innovative chemical manufacturer. The center shows the benefits of applying process re-engineering and technology.
- Another business integration center, Hospital of the Future, represents Andersen Consulting's vision of the systems technologies that will support the health care delivery system of the 1990s. Located in Dallas, the exhibit will serve as a permanent site for Andersen Consulting and more than 20 participating vendors.
- The Retail Place, also located in Chicago, demonstrates a customer-driven retail operation, including sales floor, distribution center, and corporate office. The functional exhibits physically illustrate the implementation of the key strategies of customer-driven marketing, value-driven operations, and strategic vendor partnering.

Andersen Consulting reports a full-time, worldwide SI practice staff of 22,000. Exhibit AC-7 gives an indication of the distribution of personnel resources between various SI-related activities.

## 7. SI Business Objectives

Andersen Consulting wants to gain and maintain a market leadership position by being the preeminent provider of solutions to major organizations worldwide. The focus is on providing a full-service solution. Although not explicitly stated in the interview process, INPUT believes that Andersen Consulting sees itself as taking leadership as the "respected consultant/provider of strategic information systems." There appears to be three unstated business objectives:

- Emphasize all service lines to create a full-solution offering to compete with smaller niche consultancies.
- Link technology with strategic consulting, process management, and change management (people processes).
- Dominate the business process re-engineering service offering.

## EXHIBIT AC-7

**Distribution of SI Business Personnel  
Andersen Consulting**

Capability	Percent
Management, strategy, planning, marketing	5
Legal/contract administration, finance	1
Project management and administration	10
Design/development/implementation	74
Hardware/software evaluation/acquisition	5
Hardware engineering	1
Sales	4

From a business perspective, Andersen Consulting sees the revenue and profits from systems integration as a primary motivation to develop the business. That is, SI is a standalone business in terms of strategy and profitability analysis. As would be expected, proliferation of hardware and follow-on facilities management contracts are not of primary interest, although the latter has become more important in competing as a full-service provider.

It is INPUT's evaluation that Andersen is capitalizing on its industry reputation as business consultants to build a strategic dominance in the business process re-engineering domain. Andersen Consulting is positioning itself to capture the client relationship at the earliest possible point and then develop the entire SI engagement. This business strategy has obvious advantages and Andersen can successfully execute it.

**8. SI Capabilities Evaluation**

And as might be expected, Andersen Consulting has full in-house capability at the high end of the development life cycle, and also as might be expected, makes heavy use of alliances in the areas of systems software, hardware, custom and communications hardware, and hardware maintenance. A summary of Andersen Consulting's capabilities follows:



- Business Consulting, Design, and Project Management—Clearly this is the area of Andersen Consulting's strength. The combination of a solid methodology along with uniform and effective training of its personnel produces consistent, if not always exceptional, results. Consistent with the professional services orientation of the firm, education, training, and documentation are also significant skills that AC markets heavily as part of its capabilities.
- Packaged Applications Software—This is clearly an area of strength for AC. It has made significant investments in the development of numerous packages. (See Section 5 and Exhibit AC-8). The aggressive marketing of these packages, along with the development and utilization of strong alliances to fill the gaps, gives Andersen Consulting a very strong position within its competitive group in the applications software area.
- Systems Software/Computer and Communications Hardware—This is an area where Andersen Consulting consistently utilizes other vendors' products, most often through alliances.
- Network Management/Operations—Although AC does have some contracts in which it performs these functions, this area is neither a primary focus of business nor an area of strength. Because of the long-term importance of networks to worldwide business solutions, AC recently announced an alliance with Infonet and SigmaNet, which have worldwide networking capability.
- Andersen has identified the systems operations, systems management, networking management, and outsourcing service area as one of potential growth. For a detailed analysis, consult the Andersen Consulting vendor profile from INPUT's *Information Systems Outsourcing Competitive Analysis*.

In the past, one criticism of Andersen would have been a lack of true in-depth focus on technology. This deficiency has been aggressively addressed with a multipronged approach. The business integration centers display leading edge uses of technology. Andersen was the first services-oriented company to join the research consortium MCC. It is also a member of the Institute for the Learning Sciences, Software Engineering Research Center, and Software Engineering Institute research consortium. AC has aggressively recruited senior technologists for CSTaR.

CSTaR is tasked with researching and developing uses of technology to solve business problems. CSTaR is part of Technology Services, which also has organizational focus on methodologies, tools, training, network solutions, client/server and downsized architectures, image systems, artificial intelligence, and other advanced developments.

EXHIBIT AC-8

**Andersen Consulting  
Applications Software Products—Some Examples**

Product	Description
MAC-PAC/D Family of Products	Specialized, fully integrated manufacturing enterprise management system for aerospace and defense contractors and other project-oriented manufacturers.
MAC-PAC for the IBM AS/400	Integrates manufacturing, distribution, and finance into a single on-line management system. MAC-PAC provides the flexibility needed to operate in a full Manufacturing Resource Planning MRP II), Just-in-Time (JIT), or a mixed MRP/JIT environment. It integrates multiple processes, products, and businesses for enterprise-wide management.
DCS/Logistics DCS/Logistics for the VAX	On-line Digital VAX and IBM mainframe-based computer system with applications that support the order processing, inventory management, distribution, warehouse management, and logistics function of medium-to-large manufacturers, distributors, wholesale distributors, or retail distributors.
PROCESS/1	Complete software solution engineered for the process industry. Software provides companies with the flexibility to support distributed plant operations while maintaining critical linkages with enterprise and process control systems.
FOUNDATION	A comprehensive, integrated ICASE tool set that includes FOUNDATION for Cooperative Processing, METHOD/I, PLAN/I, DESIGN/I, and INSTALL/I.
PIOS	(Production and Inventory Optimization System). On-line manufacturing control system acquired from McCormack & Dodge.

In fiscal year 1993, Andersen established a technology competence group in the Americas region. As part of IS&T, it seeks to disseminate technology skills in AC's Americas region. One example of the focus on technology is that each Andersen consultant receives 500 hours of client/server training.

INPUT believes that, overall, Andersen Consulting has significant capabilities in the areas that are most important for winning and executing SI contracts. Its focus on the top end of the life cycle, and perceived strengths in understanding business solutions in many industry sectors gives it an edge on the market that few others have.

## 9. SI Strategic Alliances

Andersen Consulting has established some significant alliances that strengthen the firm's SI capabilities. As with most other major systems integrators, AC utilizes both long-term and project-by-project alliances. AC believes that the use of alliances supports its strategy for SI by:

- Enabling Andersen to provide a complete solution of applications software, hardware, and networks
- Giving it early access to new technologies
- Providing assistance in financing projects
- Supplementing areas where it has limited internal capability, such as maintenance support and worldwide communications

The majority of its longer term alliances have evolved from working with particular subcontractors or partners on a repetitive basis. Other alliances have developed as a result of Andersen's strategy to develop industry-specific software.

In 1989 Andersen Consulting established the Business Integration Partnership (BIP) program. The objective of the program is to enhance Andersen Consulting's capability through alliances with leading hardware and systems software vendors. Alliances with technology vendors enable AC to bundle products and services in the solutions it provides to clients and allows the client to deal with a single solution provider.

Through value-added reseller and systems integrator agreements, Andersen Consulting resells or jointly markets its BIP technologies as part of a full-service solution. The agreements are non-exclusive and typically do not have a vertical market focus. However, many of the vendors' products are featured as key components of the technologies demonstrated at Andersen's business integration centers.

Andersen's BIP program focuses on establishing alliances necessary to fulfill AC's mission to be the premier provider of full-service re-engineering. To this end its alliances include H-P, Digital, AT&T/NCR, IBM, Sun Microsystems, Informix, Sybase, and other leading hardware and systems software vendors. Special emphasis is on establishing reseller agreements that support Andersen's development of client/server solutions.

## 10. SI Capabilities Summary

Andersen Consulting's strengths far outweigh its weaknesses as a systems integrator. In fact, its strong set of capabilities in the high end of the life cycle serves to reduce significantly its dependencies on outside suppliers for the high-risk elements of most SI contracts. Its strengths in software development, project management, and packaged systems and applications software have contributed measurably to the firm's success. The weaknesses in service and repair and, to some degree, equipment design integration, are not critical to success in the business, particularly in the vertical markets on which AC has focused.

Andersen Consulting's alliances and applications software offerings also add significantly to its overall capabilities. The FOUNDATION development and implementation methodology is probably the best-known package of its type in the industry.

Finally, Andersen Consulting has always placed heavy emphasis on training. Utilizing its internal training and development capabilities, Andersen Consulting has adopted a strategy of consistent development of its staff. Therefore, AC professional personnel understand the processes used in acquiring and executing the business. They can be deployed in the organization when and where needed. The resulting consistency from this approach facilitates the effective deployment of personnel in SI efforts and is a great asset. Andersen states that it spent approximately \$7,200 on each consulting professional for internal training in fiscal year 1991—a total cost of \$151 million. This equates to an average of 19 person days per consultant per year.

## 11. SI Marketing Strategy

The backbone of Andersen Consulting's marketing approach is its vertical business focus and business process orientation (See Section 4). The process is targeted at developing high-level business solutions and converting them into the application of information technology. AC was one of the first, and clearly is one of the most successful, systems integrators to approach the mission-critical systems market. AC methodology is at the heart of each project. AC understands the value of developing relationships with high-level managers in target firms and industries and very effectively utilizes referral selling at these levels. AC's demonstrated capability of dealing with projects over \$50 million makes it one of the few commercial systems integrators that can make that claim.

## EXHIBIT AC-9

**Andersen Consulting—SI Strategic Alliances  
(Limited Sample)**

Product	Description
Hardware	Amdahl IBM Hewlett-Packard DEC Tandem Sun Microsystems AT&T/NCR
Applications Software	SAP (Financial) Lotus Oracle Coda PeopleSoft QSP
Systems Software	IBM Informix Trinzic
Cooperative Marketing	Aetna (Insurance)
Networking/ Telecommunications	Infonet Synoptics SigmaNet

In addition, as part of its marketing process, AC has developed and utilizes five business integration centers, which feature conceptual demonstrations of potential new technology integration and utilization. The business integration centers are a unique marketing approach. The centers are an excellent vehicle to demonstrate to the client what an SI program could accomplish.

- **Competitors:** Andersen Consulting sees IBM and EDS as its prime competitors. In the federal marketplace, it adds CSC to that list. As AC broadens its targets to smaller systems opportunities, it will undoubtedly find a few more competitors.

- **Positioning:** Andersen Consulting's primary positioning with respect to customers/prospects is to promote its ability to help its clients change their organizations to be more competitive by linking strategy, process, people, and technology. AC uses this consistent theme in combination with its in-depth vertical industry expertise to present itself as the number one seller of business solutions. AC has invested heavily in recent years in developing its technological expertise. Though this is still not a primary positioning point, it certainly plays a role when presenting the entire package to the customer. INPUT believes these capabilities will become more significant in the future.
- **Promotion:** Andersen Consulting uses essentially all forms of promotion for its SI market strategy, even network television. However, AC indicates that the jury is out on all approaches except qualified client referrals, direct marketing, and utilization of the business integration centers, which it rates as highly effective. In addition, AC uses public seminars with some degree of success.

Finally, INPUT believes that Andersen Consulting enjoys a strong marketing position among leading systems integrators that is worthy of comment. AC frequently "writes" the RFP, at least in the figurative sense. AC's business consulting skills often give it entry to the prospect's environment long before a solution or even, at times, the problem, has been defined. Operating from a high-level position as a consultant and supported by its comprehensive methodology (METHOD/I), AC has often closed the business before it has been opened. As a full-service provider, AC is a logical selection for implementor once the consulting is done. Exhibit AC-10 summarizes Andersen Consulting's market strategy.

#### EXHIBIT AC-10

### Andersen Consulting Marketing Strategy

- Direct marketing/business processes
- Strong methodology
- Vertical market focus for commercial marketplace
- Primary competitors: IBM, EDS, CSC
- Positioning: Industry/business knowledge, re-engineering, full-service
- Promotion: referral, technology centers

## 12. SI Customer Base Specific Projects

Andersen Consulting reports that about 80% of its commercial systems integration clients come from its existing account base and about 20% from new prospects specifically solicited for SI. In the federal marketplace, the split is 50% from each source. Undoubtedly, the high percentage of repeat business in the commercial market reflects AC's long-term account relationships with larger firms, while the 50/50 split in the federal market is indicative of its more recent entry into that marketplace and the fact that the federal market is more RFP-driven. In both markets, AC claims that its business has been profitable.

In recent years, AC has moved from a position of mainly pursuing very large projects to soliciting smaller ones as well. INPUT estimates that AC wins almost 60% of the projects it actively bids on; and it has completed projects ranging from \$2 million to \$80 million (average size about \$10 million). AC's top commercial customers are concentrated in discrete and process manufacturing, telecommunications, state and local government, banking and insurance, airlines, and the federal government.

It is also interesting to note that Andersen has performed SI engagements for companies that have their own SI capabilities like Ameritech, Boeing, Lockheed, and Martin Marietta.

Exhibit AC-11 contains information on some of AC's key SI engagements.

## 13. Summary and Future Directions

Andersen Consulting has an excellent overall image and capability as a systems integrator. Strengths include its ability to manage the client's planning process, the resources to handle very large projects, and its focus on professional services. Its ongoing investments in key applications software products and the continued development and education of its professional staff will continue to build the positive momentum it has in the marketplace. Recent investment in technology will pay dividends in the near future.

Not to be overlooked on the positive side is AC's ability to formulate client requirements. Focusing on the high end of the life cycle, AC frequently "writes" the RFP, so to speak—a position that many of its competitors envy. The result is a very high success rate in winning contracts, which minimizes marketing and bid preparation costs.



## EXHIBIT AC-11

### Examples of Andersen Consulting's SI Contracts

Company or Industry	Project Description	\$ Millions
Lockheed	Computer-aided layout/fabrication	3.0
Ashland Chemical	Order entry/inventory control	5.5
Ca. Dept./Development Services	Cost recovery system	3.6
Jet Propulsion Laboratory	Integrated management and administrative system	10.2
State of Texas	Executive information system and decision support system linked	2.6
Prudential Corporation	Image processing system	4.2
State of Montana	Human services systems	15.5
Department of Veteran Affairs	Integrated supply management systems	5.8
Northwest Airlines	Revenue accounting, image processing	NA
1992 Winter Olympics 1994 Winter Olympics	Build client/server system to manage Games, report statistics	4.5 (1994 contract)

NA = Not available



In those areas where Andersen Consulting might be perceived as being weak, plans are in place to strengthen capabilities.

- The "by the book" (perceived by some as overly structured) approach to design and engineering is fading as higher level and better trained consultants enter the SI practice.
- A weak technical image is being overcome by heavy investment in proprietary technology and strategic business solutions using multiple sources of technology.

The future looks bright for Andersen Consulting. INPUT expects its market approach to become more aggressive. INPUT anticipates increased focus on Europe and Asia. In addition, the market can anticipate further heavy investments by AC in technology to support both vertical and, to a lesser extent, cross-industry markets.



## COMPANY PROFILE

---

### BDM International, Inc.

#### 1. Key SI Contacts

BDM International, Inc.  
7915 Jones Branch Drive  
McLean, VA 22102  
Dr. William E. Sweeney, Jr.  
Executive Vice President  
Andrew F. Bilinski  
Corporate Vice President  
(703) 848-5000

#### 2. Description of Principal Business

BDM International, Inc. is a diversified growth-oriented professional and technical services firm that provides advanced technology and other contract support to public and private sector clients. The company serves clients in defense, communications, logistics, energy, environment, space, transportation, manufacturing, product distribution, and public policy.

A small company named Braddock, Dunn, and McDonald, Inc. (for its three physicist founders) began operations in 1960. Its offices were in El Paso, Texas, near the U.S. Army's White Sands Missile Range, BDM's first client. The decade of the sixties was one of modest but steady growth and expansion of BDM's technology, client, and revenue base. By 1970, BDM had neared \$4 million in annual revenue.

Growth accelerated sharply in the second decade. BDM moved its headquarters to metropolitan Washington, D.C., where a management team headed by President and CEO Earle Williams began planning and directing business development. The Company's name was changed twice, first to the BDM Corporation (1975) and then to BDM International, Inc. (1979)

Diversification into new areas of energy, environment, transportation, and public policy marked the 1970s, although the business base remained largely—85% or more—associated with national defense. At the end of the decade, BDM operated 20 offices including one in Saudi Arabia. 1980 revenue totaled \$83 million.

BDM's initial public stock offering took place in 1980, followed two years later by the company's listing on the American Stock Exchange. Revenues continued to climb, exceeding \$100 million in 1982, \$200 million in 1985, and \$300 million in 1986.

In 1988, BDM was acquired by Ford to operate as a separate professional services subsidiary of Ford Aerospace Corporation. In early 1990, Ford Motor Company announced its intention to sell all of Ford Aerospace. BDM, concerned about existing and potential conflict-of-interest perceptions and their impact on its business, sought to be spun off separately. BDM management was supported in this objective by the Carlyle Group, L.P., a Washington-based merchant banking firm headed by former Defense Secretary Frank Carlucci. As a result, BDM reemerged as an independent company (BDM Holdings, Inc.) in October 1990, allied with Carlyle. BDM International continues to be the principal operating company.

In 1991, BDM common stock was made available for a limited time to company employees. Today the company is owned in part by these employees as well as by senior BDM management, Carlyle, and certain other investors. The company is financially sound.

In March 1992, BDM Holdings acquired Vinnell Corporation of Fairfax, VA. Vinnell is a \$100 million professional and technical services company with approximately 1,700 employees. It provides training, operations, and maintenance services to a variety of U.S. and foreign government agencies. Vinnell and BDM will operate as separate sister companies.

BDM's 1991 revenue (prior to the Vinnell Acquisition) reached \$296.8 million and net income was \$520,000. In Exhibit BDM-1, financials for 1990 have been segmented to show BDM's operations as a subsidiary of Ford (January through September 1990) and as an independent company (October through December 1990).

## EXHIBIT BDM-1

**BDM Financial Summary**

Item	Fiscal Period (\$ Millions)			
	1991	10/1/90- 12/31/90	1/1/90- 9/30/90	1989
Revenue	296.8	74.0	232.2	355.9
Gross Profit	23.3	6.1	14.2	28.1
Net income (loss)	0.5	0.3	(4.3)	8.2
Earnings (loss) per share	0.05	0.04	N/A	N/A

Revenue for 1991 decreased 3% (\$9.5 million) compared with 1990 due primarily to a reduction of hardware purchases by clients and less use of subcontractors.

- The company's business mix has shifted to non-Department of Defense (DoD) markets. As a percentage of total revenue, DoD revenues declined from approximately 73% for 1990 to approximately 67% during 1991. The increases in other client revenues are due primarily to new contracts with other federal government agencies such as NASA and the Department of Energy.
- Revenue from cost-plus (CPF) contracts increased nearly 3% (\$5.1 million), while revenue from fixed-price (FP) and time-and-materials (T&M) contracts decreased by over 7% (\$7.5 million) and 26% (\$7.1 million), respectively, during 1991.

As of October 1992 BDM had 2,800 employees. This is an increase of approximately 10% over 1991; revenue growth in the same range is expected for 1992 compared with 1991. The parent company currently has 4,500 employees, including those acquired with Vinnell in March 1992.

BDM had \$140 million in systems integration (SI) revenue in 1990 and \$150 million in 1991. Most of that, 86% or \$120 million in 1990 and 83% or \$125 million in 1991, was from federal SI. BDM estimates that its average annual growth rate for commercial SI will be twice its federal SI rate of 6%. BDM estimates that its margins for both commercial and federal business will remain stable.

Exhibit BDM-2 shows the mix of products and services in the company's commercial and federal contracts.

**EXHIBIT BDM-2****Mix of Products and Services**

Product/Service	Percent of Contract Value	
	Commercial	Federal
Equipment	40	15
Packaged Software	20	5
Professional Services	20	40
Software Development	20	40

In keeping with the new paradigm for SI, 80% of the company's SI projects are based on distributed systems. INPUT expects this is because 90% of its commercial SI business comes from new accounts. During 1991, BDM worked on 800 different contracts, many of which involved multiple services and tasks.

BDM provides professional and technical services, under contract, to clients in defense, communications, logistics, energy, the environment, space, transportation, manufacturing, product distribution, and public policy.

- BDM applies its expertise in systems engineering and development (including systems architecture, design, and integration) to meet the requirements for information and data systems, advanced manufacturing systems, and communications networks and systems—and their combinations.
- BDM applies advanced technology to solve problems and improve operational and systems performance and effectiveness. The company's technology base includes methods and procedures (modeling, simulation, planning and analysis tools) and systems methodologies (software productivity, computer-integrated manufacturing, concurrent design, and manufacturing), as well as artificial intelligence, advanced computing, image processing, microelectronics, sensors, photonics, lasers and optics, artificial neural systems, intelligent processing of materials, robotics, and other areas.

With the retirement of Mr. Earle C. Williams, Mr. Philip A. Odeen was brought in as president and CEO. He had been serving as vice chairman, Management Consulting Services for Coopers & Lybrand after a lengthy career with the firm's consulting component in Washington, D.C., as a managing partner. One of Mr. Odeen's primary challenges will be to accelerate BDM's diversification into commercial and international markets.

### **Federal and National Information Systems**

By INPUT's definitions of SI, much of what BDM does is not SI but projects that contain some elements of SI. They are included to illustrate the technical capabilities of BDM, which have always been BDM's strength.

The Securities and Exchange Commission (SEC) chose BDM to develop and integrate the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. On October 31, 1991, BDM completed the first six months of public use of the operational EDGAR system. In this eight-year, \$70 million program, BDM is installing the hardware and developing the software that allows public corporations to file documents electroni-

cally with the SEC, enables SEC analysts to review filed documents on advanced computer workstations, and permits immediate dissemination of information to the investment community. When completed, EDGAR will serve approximately 15,000 public companies, and the SEC has estimated that it will generate cost savings of \$170 million.

BDM continues to provide information resource management support to the Department of Veterans Affairs, ranging from cost-benefit analyses to information systems planning. BDM assessed software engineering processes and computer security practices and devised a set of improvements for implementation.

BDM, as engineering support contractor, designed a complex, multimedia communications system to tie together the facilities of the Federal Aviation Administration's (FAA) National Airspace System. Also for the FAA, BDM began design of the Data Multiplexing Network and the Low Density Radio Communications Link and addressed the assignment of channel segments.

BDM continues the development of a comprehensive system to integrate critical information throughout the Strategic Defense Initiative Organization (SDIO) for management of the multibillion-dollar SDI program. The system will link the information systems of government agencies and others involved with SDI.

BDM designed and developed an optical disk-based information system to store all the personnel records and files for the U.S. Army Enlisted Records and Evaluation Center. This pilot project demonstrated the advantages of optical imaging and served as a proof of concept prototype for an Army-wide personnel document management system.

In 1991, BDM successfully completed the rehosting of the computer-based system that processes millions of Department of Defense security clearance records. BDM also developed a functional description and process flow charts for the Defense Investigative Service (DIS) National Computer Center.

For the state of Montana, BDM designed, developed, and implemented advanced information systems called Family Assistance Management System (FAMIS), which increased central control, efficiency, and responsiveness in a variety of critical areas involving delivery and management of public services. Also, to attack the problem of delinquent parents renegeing on child support agreements, BDM is developing and integrating an automated program for Montana called "SEARCHS"—System for the Enforcement and Recovery of Child Support.

BDM also continued and expanded similar efforts for the state of New Mexico's Human Services Department, including mainframe and network services, management of statewide computer and telecommunications operations, and application support for the Integrated Services Delivery System. Since 1988, BDM has assisted New Mexico in developing the largest and most successful electronic benefits transfer (EBT) program in the nation. EBT allows human services program recipients to receive and use their benefits electronically through automatic teller machines and point-of-sale terminals in grocery stores.

For Michigan's Department of Transportation, BDM assisted in the development of an advanced data architecture to provide integrated information in a timely manner and usable format.

### **Command and Control**

In continuation of a joint Defense Nuclear Agency (DNA)/Defense Communications Agency (DCA)/U.S. Pacific Command program, BDM provided computational and communications automation in support of a new mobile command center called the Enhanced crisis Management Capability. BDM's automation support for this mobile command center had its genesis in the Theater Analysis and Planning systems developed for DNA under a variety of corps- and theater-level command and control programs.

BDM continued its support during 1991 as systems integrator for the Army Operations Center upgrade project. The Army Operations Center is the Pentagon facility that coordinates and manages crisis operations.

BDM continued its major role in support of the improvement of our nation's tactical Command, Control, and Communications (C<sup>3</sup>) assets by providing test and integration support to the development of the All Source Analysis System; developing and testing software for the U.S. Army's Maneuver Control System; and providing extensive support services to the Joint Tactical Command, Control and Communications Agency.

BDM assisted in the design, development, and evaluation of C<sup>3</sup> systems for the U.S. Transportation Command. The effort expanded in 1991 and included life cycle evaluation of candidate systems, design and logistics studies, and training evaluations.

### **Strategic, Theater, and Tactical Defense**

The comprehensive challenge of being a "Super SETA" (Scientific, Engineering, and Technical Assistance) contractor for the Strategic Defense Initiative Organization (SDIO) required a wide range of BDM's expertise. In 1991, BDM assisted in implementation planning for the



Global Protection Against Limited Strikes (GPALS) system, SDI's current focus. BDM also supported an SDIO counterforce capability plan, providing detailed threat data, sensor-target intervisibility analysis, and weapon-target interaction analysis for incorporation into SDIO modeling.

BDM helped the U.S. Army Strategic Defense Command strengthen Theater Missile Defense, providing systems engineering and assistance under the Combined Allied Defense Effort, a key element of SDI. BDM also developed active survivability enhancement options for the ground-based elements of the National Missile Defense component on the GPALS mission.

BDM extended the state of the art in interceptor projectile technologies by developing innovative concepts for exoatmospheric projectiles under the Army's Advanced Projectile Interceptor Contract and the High Endo-Exoatmospheric Strapdown Seeker contract. BDM's theater technology expertise provided independent evaluations of "Smart Weapons" technologies and supported another effort in involving armor and anti-armor munitions and the nation's next generation land combat vehicles.

### **Design Engineering**

Under a Design Engineering Program contract with the U.S. Air Force Ogden Air Logistics Center, BDM applied technology to increase the reliability and maintainability of a comprehensive range of Air Force weapon systems. Work initiated or underway in 1991 included development of an automated laser system to remove paint from F-16 radomes manufactured from advanced composite materials; redesign and fabrication of an improved elevator work cage for access to missiles in silos; and modification of the 1960-vintage test set for a missile's explosive set circuitry to ruggedize the missile and reduce its size and weight.

### **Test and Evaluation (T&E) and Training**

In 1991, BDM expanded its support to the Army Operational Test and Evaluation Command and began supporting the Joint Interoperability Test Center (JITC). Large-scale efforts encompassed test design, conduct, and performance assessment of operational systems.

### **Transportation Analysis and Systems**

In support of the Volpe National Transportation Systems Center (VNTSC), BDM began development of a comprehensive information model for the Army and provided support to VNTSC's leading edge INTRANSIT system, calling upon BDM's expertise in systems integration, mapping databases, over-the-horizon tracking, computer security, counter-narcotics, and satellite support.

### **Advanced Warehousing and Distribution**

In 1991, BDM initiated a strategic alliance with Alpha & Omega Integrated Control Systems, Inc. (A&O), a technological pacesetter in software for the automated distribution marketplace. This alliance opened a promising new marketplace to BDM.

Both Bell Canada and Ciba Geigy chose BDM to be the system integrator for automated warehousing and distribution systems at multiple sites. Each project is valued in multimillion dollars, and BDM's selection in both cases resulted from the innovative solutions offered by the BDM/A&O team and by BDM's own reputation as a systems integrator. The Ciba Geigy award also enhances the company's growing reputation in the important international pharmaceuticals market.

More recently, BDM was chosen to perform warehouse management SI services in the U.S. and abroad for the Business Logistics Services of Federal Express Corporation.

### **Logistics Systems and Services**

The Requirements Data Bank (RDB) program awarded by the U.S. Air Force Logistics Command (AFLC) to BDM in 1984, is the cornerstone of the AFLC's modernization program. This 10-year program, with a potential value exceeding \$230 million, involves all aspects of computer/software systems integration.

RDB helps plan and track total Air Force purchase, maintenance, and repair requirements for over one million items, approximately \$28 billion of inventory, and 75 major weapon systems. The goal of the RDB effort is to field a logistics tracking system that increases operational readiness and control, reduces budget preparation time, improves strategic planning, and standardizes the spare part requirements process.

In 1991, BDM continued automating the process for managing Air Force logistics requirements and spare parts, with over 2.5 million lines of computer code installed and more than 6,000 users supported on a daily basis. The RDB program received the Logistics Management Systems Center Commander's award for excellence in 1991.

In support of the U.S. Army's comprehensive logistics modernization program, BDM undertook a series of tasks for the Army Strategic Logistics Agency to determine base requirements in transportation and other areas.

Under the Pacer Frontier program, BDM contributed to enhancing the logistics support infrastructure for the Air Force Logistics Command in support of the Space Command located near Colorado Springs, which is responsible for first alert in case of an attack against North America. The Pacer Frontier program incorporates many proven BDM technologies and includes use of the BDM-developed Software Blueprint<sup>SM</sup> and Management Decision Support System.

### **Air Traffic Control and Airspace Management**

This key marketplace was significantly penetrated by BDM in 1991 through the award of two landmark contracts. In the highly competitive Peace Panorama program, BDM was chosen by the U.S. Government to assist in developing an airspace surveillance system for Colombian airspace.

Under the FAA's Automation Bridge research and development effort, BDM is defining and evaluating an air traffic control (ATC) system that is functionally equivalent to the currently installed terminal radar approach control (tracon) systems, using state-of-the-art computer systems and architectures.

During the conduct of several programs, BDM developed a proprietary ATC system that combines proven off-the-shelf computer hardware and BDM-developed applications software. A full range of ATC capabilities can be provided by this system to meet the needs of governmental, commercial, domestic, and international clients requiring a state-of-the-art, turnkey system for advanced airspace management. BDM systems can operate as standalones or be fully integrated into National Airspace System operations.

### **Airport Security**

BDM provided security engineering services to the Detroit Metropolitan/Wayne County Airport, completing the design of an automated access control system for the air operations area. The system meets strict FAA standards and includes personnel badging, vehicle permitting, door and gate access control, closed circuit television monitoring, and perimeter intrusion detection.

### **Space Science and Applications**

BDM greatly expanded its space activities in 1991. The company was selected by NASA to provide engineering, scientific, and program support for the Earth Observing System (EOS), the primary element in NASA's "Mission to Planet Earth" program. Winning a recompetition of NASA's Astrophysics Division support contract further confirmed BDM's role in

helping advance space science and applications, as BDM scientists and astrophysicists continued their work with NASA on the great Observatories program—four, billion-dollar satellites that will observe the universe in complementary spectral regions.

BDM also continued its support of the Space Station Freedom program, evaluating science and commercial utilization requirements for the space station and coordinating with NASA field centers, other federal agencies, and international teaming partners. Although NASA Headquarters was BDM's principal client, the company's assistance to NASA also encompassed activities for individual NASA offices and centers.

### **Advanced Manufacturing Systems**

BDM's work on the SEMATECH Semiconductor Generic Manufacturing Model was expanded to include development of next-generation Distributed Factory System prototypes and a survey of state-of-the-industry wafer fabrication equipment controllers.

BDM supports modernization initiatives in the areas of enterprise integration technology, concurrent engineering, information resources management, and the application of systems development methodology and product life cycles to support systems and software development programs. This work includes enterprise analysis, systems development projects, technology transfer, tutorials, and training seminars for manufacturing firms.

For several large clients, BDM completed the design, development, and installation of automated production line equipment and customized control system software. BDM also provided related training and long-term maintenance.

### **Information and Telecommunications Systems**

In 1991, BDM initiated a corporate thrust to become a major provider of services to law firms, corporate and governmental legal departments, and state, local, and federal judiciary systems. The company was selected by a major Washington, D.C.-based law firm to be its systems integrator on a nearly \$2 million information system replacement project.

BDM completed a planning study for the World Bank, postulating a future electronic communications environment with integrated voice, image, graphic, and textual data. BDM also developed specific recommendations for migrating the Bank's current telex, facsimile, and electronic mail services toward that goal.

### 3. Company Competitive Position

Approximately 90% of BDM's 1991 revenue was derived from the U.S. government, including subcontracts (67% from the DoD and 23% from other government agencies), 3% from foreign government clients (including services to foreign governments through the U.S. government), and 7% from commercial and other clients.

Approximately 97% of BDM's 1991 revenue was from the U.S. and 3% from international sources.

BDM is the prime SI contractor 60% and the subcontractor 10% of the time. It supports SI contracts managed by the client 30% of the time. Thus, BDM is either the prime contractor or offering professional services for most of its SI engagements.

Exhibit BDM-3 shows the level of relative margins that BDM realizes from SI components.

EXHIBIT BDM-3

#### Level of Relative Margins Realized from SI Components

Integration Component	Level
Standard hardware and software	L
Customized hardware and software	M
Software packages	L
Consulting/design/integration	H
Custom software development	M
Project management	M
Training and education	M
Post-installation operations	M

H=High M=Medium L=Low

BDM's markets, which are largely in the continental U.S., are served through a network of operations centers, site facilities within or near client operations, and other offices supporting regional and local client bases.

- The largest BDM operations are located in McLean (VA), Albuquerque (NM), Columbia (MD), Dayton (OH), Germantown (MD), Huntsville (AL), and Riyadh, Saudi Arabia.

- BDM has an additional 45 offices worldwide.

A range of mainframe, minicomputer, and microcomputer systems; networks; and workstations assist BDM in providing professional services and support to its clients.

- Large-scale DEC VAX and IBM systems are located at several major BDM sites, networked and accessed through a variety of leased lines and dial-up links. Remote access is provided via terminal or microcomputer.
- IBM communication software controls BDM's network of more than 1,000 terminals and workstations, composed of local-area networks (LANs) that are bridge at each main technology center to a wide-area network (WAN). Gateways perform protocol conversions, which allow all LAN workstations connectivity into the IBM and/or VAX mainframes.

#### 4. Markets Served

INPUT expects the new leadership at BDM International, with BDM's new corporate structure and its focus on developing non-DoD and commercial opportunities, to discover new markets for BDM. BDM's current markets are shown in Exhibit BDM-4.

EXHIBIT BDM-4

#### Vertical Markets Served by BDM

- Education
- Federal Government
- Logistics
- Manufacturing
- Public Policy
- State/Local Government
- Transportation
- Wholesale/Distribution

## 5. Recent Events of Interest

In May 1992, Philip Odeen, a Coopers & Lybrand executive became president and CEO succeeding Earle C. Williams. Mr. Odeen was vice chairman of management consulting services at Coopers & Lybrand's New York office. Before that, he ran the accounting and consulting firm's Washington, D.C.-based federal consulting business. This is a significant change of leadership because Mr. Williams had almost become synonymous with BDM over the years.

BDM was awarded a four-year, \$17 million contract to design and install an operations control center to provide the Washington Metropolitan Area Transit Authority (WMATA) with a state-of-the-art capability to monitor, supervise, and control rail, maintenance, security, and passenger operations. BDM initiated development on the control center, including a large-scale projection display system to monitor rail operations and a programmer/engineer/training facility to simulate rail operations and play back historic incident data in real-time simulation.

On March 13, 1992, BDM Holdings, Inc. announced the acquisition of Vinnell Corporation. Vinnell operates as a wholly owned subsidiary of BDM Holdings. Vinnell is a \$100 million professional and technical services company.

In early 1992, BDM regained its prominence in the test-and-evaluation market by winning a \$116.6 million contract from the Defense Information Systems Agency (DISA) Joint Interoperability Test Center (JITC). The contract has a two-year base and three one-year extensions. BDM will plan and conduct tests on the interoperability of tactical and strategic command, control, communications, and intelligence systems used in joint or combined military operations. The company will also support JITC in operational tests and evaluations of large-scale information management systems.

On July 15, 1992, SEC's EDGAR became operational as the system began accepting live filings, electronically, following a successful test period. The government has estimated that the total system costs will be \$75 million, up from the original 1989 award of \$51.5 million. Mandatory EDGAR filings are not expected to start until next spring. Some of the system's cost to the government will be offset by revenue generated by commercial use of the data.

## 6. SI Organization

Like many large DoD aerospace firms, BDM has matrixed SI activity. SI is an opportunistic activity that is applied where necessary to win programs.



BDM has been in the system integration business for 15 years. BDM believes it is strong in the core capabilities of technology expertise and client relationships. BDM feels that it is almost as strong in the ability to manage risk, project management skills, and vertical industry expertise. BDM is in SI primarily because of expected revenues and profits and being able to respond to customer demand. Secondly, the company is in SI because of the opportunity to win follow-on facilities management contracts and the strength that it can give to follow-on non-SI business.

Because BDM has a matrixed organization, the responsibilities and activities required to manage and execute an SI contract are also matrixed. Exhibit BDM-5 shows the organization's approach to responsibilities.

EXHIBIT BDM-5

### BDM's Approach to SI Responsibilities

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	D
Marketing and promotion	B	D
Account management/sales	B	B
Contract review/approval	C	C
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operation	C	C

A=Centralized B=Both C=Decentralized

## 7. SI Business Objectives

As BDM enters its second full year as an independent company, its focus is to reestablish the pattern of growth that was so evident during the 1970s through 1986. The growth of a professional services firm is achieved by the successful passage through a gateway from one level of business activity to a higher level. This is being accomplished through one of five steps, termed *gateways* by BDM. BDM gateways are listed in Exhibit BDM-6.



## EXHIBIT BDM-6

**BDM Gateways**

- **GATEWAY 1—Building of Basics, Responding to Change:** This Gateway is characterized by the combination of a long history of BDM work in a given area with our flexibility to respond to changing market conditions.
- **GATEWAY 2—Major Growth, Current Clients:** In this Gateway, the legacy of providing quality service to a specific client results in an abundance of opportunity for substantial growth.
- **GATEWAY 3—Major Wins, Major Markets:** This Gateway is characterized by the successful winning of a major contract that generates tens of millions of dollars per year in revenue.
- **GATEWAY 4—Key Market Penetration:** In this Gateway a key contract, in a new area of endeavor, provides the opportunity for an entire new business area in BDM.
- **GATEWAY 5—Strategic Alliances and Investments:** This Gateway results from the synergistic combination of BDM skills and experience with a complementary set of skills possessed by another firm.

Source: BDM Corporation

In the SI market, BDM is targeting vertical markets. Its primary targets include the distribution/warehousing, manufacturing, transportation (air traffic control and transit control), and legal industries. The selection criteria for the SI target markets are strategic directions, probability of win, fit with BDM capabilities, and profit potential.

In terms of annual revenue from federal business, approximately 50% is derived from new contracts (80% of which resulted from responding to RFPs) and 50% from additions and modifications to existing business. BDM's aggressiveness in the commercial SI market is shown by the fact that 35% of its commercial SI revenue comes from responding to RFPs, 25% from focused marketing, and 25% from trade advertising, whereas only 15% comes from leveraging existing clients.

In summary, BDM is positioning itself in the commercial SI market emphasizing quality solutions tailored to clients at affordable costs.

## **8. SI Capabilities Evaluation**

SI is a business offering that provides a complete solution to an information system, networking, or automation requirement through the custom selection and implementation of a variety of information systems products and services. A systems integrator is responsible for the overall management of a SI contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contract price. To be included in the information services market, SI must involve some application development component. In addition, the majority of the cost must be associated with information systems products and/or services.

Exhibit BDM-7 lists the primary capabilities required to deliver systems integration. In the table, the first column indicates the capability exists in-house, the second column indicates the strength of that capability in-house, and the third column indicates if BDM commonly uses alliances for that capability.

## **9. SI Strategic Alliances**

In general, BDM has no formal program with respect to alliances. Most alliances are formed on a contract-by-contract basis. BDM has OEM and VAR agreements with most major hardware and software vendors. The one long-term alliance is discussed next.

In mid-1990, BDM initiated a new thrust in its systems integration business area, focusing on warehouse and distribution system automation. One of the initial steps taken was a survey and assessment of the wide variety of commercially available software packages that promise to automate various warehousing functions. BDM discovered that in one area—warehouse distribution systems—one vendor's software package appeared to be far superior to any other. This vendor is Alpha & Omega Integrated Control Systems, Inc. (A&O), located in suburban Pittsburgh (PA). BDM decided to subcontract a portion of its first bid in the distribution system automation area to A&O. Thus began a relationship that has proved beneficial to both companies.

## EXHIBIT BDM-7

BDM Primary SI Capabilities			
Capability	Exists (Y/N)	Strength (H/M/L)	Sub-contractors (Y/N)
Business consulting	Y	L	Y
Design methodology	Y	H	N
Design/integration	Y	H	N
Project management	Y	H	N
Software development	Y	H	Y
Education/training/ documentation	Y	M	Y
Packages applications software	Y	M	N
Packaged systems software	N	N/A	Y
Standard computer hardware	N	N/A	Y
Custom computer hardware	N	N/A	Y

A&O is a small but growing firm specializing in designing and implementing state-of-the-art systems for distribution system automation. The service that A&O provides includes design and engineering support to tailor its proprietary software product—called DOMS™ (the Distribution Operations Management System™)—to the specific needs of the particular client.

#### 10. SI Capabilities Summary

BDM has several capabilities that give it an advantage over the competition. For projects involving CASE and design methodology, BDM has both Software Blueprints<sup>SM</sup> and its software productivity enhancement centers (SPEC<sup>SM</sup>). For warehouse management it has the industry-spe-

cific software called DOMS™. BDM uses its unique strengths in hardware and software for airspace management and air traffic control and software systems. For enterprises analysis, it has strengths in IDEF and information architecture development methodology.

### **11. SI Marketing Strategy**

BDM uses only trade and industry advertising, word of mouth, and trade shows to promote its SI services; word of mouth and trade shows are more effective than advertising because of the diversity and breadth of BDM's operations and markets. BDM has a host of competitors but no principal competitor. Once BDM establishes marketing strategies under its new president and CEO, Philip A. Odeen, principal competitors may be more apparent.

### **12. SI Customer Base**

Exhibit BDM-8 list principal customers, value/duration of project, and project description.

### **13. Summary and Future Directions**

BDM has purchased itself from Ford and has installed a new president. One of the president's new challenges is to accelerate BDM's diversification into commercial business. With only 7% of BDM's 1991 revenue coming from commercial sources, most of BDM is still attuned to the federal market.

BDM is positioning itself to be responsive to clients that desire open systems. This increasing reliance on open systems will continue to cover the cost of hardware to the end user and will make it much more difficult to use hardware to generate generous margins. BDM will benefit as outsourcing continues to be corporate stratagem for reducing costs and for improving information systems for global competitiveness.

INPUT believes that BDM has the potential to be successful in commercial SI. BDM's technical reputation as well as its efforts in manufacturing and distribution will give it some early clients. It is too early to predict if BDM will be as successful in commercial SI as it has been in federal SI and professional services.

## EXHIBIT BDM-8

**BDM's Principal Customers and Products**

Customer	U. S. Air Force
Value/Duration	\$230M, 10 years
Project	System design, development, and integration of Requirements Data Bank (RDB) program
Customer	Securities and Exchange Commission
Value/Duration	\$70M, 8 years
Project	Design, development, and integration of Electronic Data Gathering and Retrieval System (EDGAR)
Customer	State of New Mexico
Value/Duration	\$23M, 4 years
Project	Systems design, development, and integration services for Human Services Department
Customer	State of Montana
Value/Duration	\$15.9M, 5 years
Project	Development and installation of state information system to support public assistance programs
Customer	Washington Metropolitan Area Transit Authority
Value/Duration	\$17M, 4 years
Project	Design and installation of operations control center
Customer	Bell Canada
Value/Duration	\$4M, 2 years
Project	Warehouse control systems integration



## COMPANY PROFILE

---

### Boeing Computer Services

#### 1. Key SI Contacts

Michael R. Hallman  
President  
Boeing Computer Services  
2810 160th Avenue, S. E.  
Bellevue, WA 98008

O. M. Landahl  
Vice President/Deputy Manager  
Information Services  
2810 160th Avenue, S. E.  
Bellevue, WA 98008

R.M. Little  
Vice President/Deputy Manager  
Information Services  
10800 Parkridge Boulevard  
Reston, VA 22091-5418

#### Federal

George Coulbourn  
General Manager  
Government Business Development  
10800 Parkridge Boulevard  
Reston, VA 22091-5418

#### Commercial

Doug Smith  
General Manager  
Commercial Information Services  
2810 160th Avenue, S.E.  
Bellevue, WA 98008

#### 2. Description of Principal Business

Boeing Computer Services (BCS), a division of the Boeing Company, supplies computing and communication resources and information services to all Boeing operating divisions, and to more than 1,500 government and commercial customers worldwide.

BCS was established in May 1970 to consolidate 13 separate computing organizations within Boeing. The division began with about \$250 million worth of computing equipment and a staff of 2,700.

Today, BCS employs more than 13,000 people located throughout the U.S. and other countries, and manages approximately \$1.4 billion worth of company-owned computing and telecommunications equipment.

BCS is currently divided into two major groups:

- **Information Services**—BCS' current noncaptive business focuses on providing strategic systems development and integration products and services to government and commercial clients. The division also provides network integration and management products and services, document and image management products and services, remote computing services (including supercomputing), systems operations services, consulting services, packaged software products, and education and training services.
- **Boeing Support Group**—Over \$1.1 billion in information services support is supplied annually to the Boeing Company and its operating divisions by the Boeing Support Group (BSG). The Advanced Technology Center, which has been a pioneer in areas such as artificial intelligence and supercomputing, is also managed by BSG.

In 1989, BCS realized significant revenues from its systems integration (SI) business, focused mainly on the federal market, as shown in Exhibit BCS-1. The company also positioned itself in the commercial SI market. BCS' 1989 noncaptive revenue is estimated at approximately \$360 million, a 30% increase over estimated 1988 noncaptive revenue of \$275 million.

EXHIBIT BCS-1

**BCS**  
**Systems Integration Revenues, 1989**

Business Component	\$ Millions*
Federal	215
Commercial	35

\*Estimated

### 3. Competitive Position

Boeing Computer Services has significant strength in a number of areas that include systems and network design, integration, and management. One of BCS' key strengths is its ability to draw upon a highly technical staff of approximately 13,000. Areas of technical specialization include:



- Systems design, integration, and management
- Network design, integration, and management
- Document management
- Image processing
- Artificial intelligence
- Supercomputing
- Facilities management and systems operation
- Program planning, management, and control
- Education and training

As a provider of SI services, BCS has a strong computer services base and a broad base of skills from which to draw. See Exhibit BCS-2. BCS is also strong in applied research, such as the application of artificial intelligence. BCS is able to demonstrate many of these skills through its Telecommunications Management Center, data centers, and nationwide networks.

EXHIBIT BCS-2

### BCS Strengths and Weaknesses

#### Strengths

- Broad computer services base
- Broad network services base
- Broad skills base
- Strong project management base
- Strong applied research

#### Weaknesses

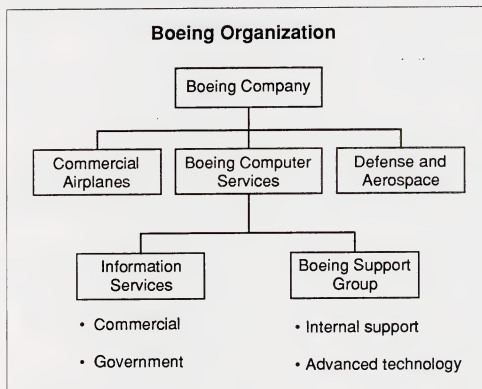
- Historical federal focus
- Historical parent company focus

Early in its history, BCS became a major player in the commercial timesharing market. Next, the company placed emphasis on becoming a major participant in the federal integration programs arena, while at the same time deemphasizing its interest in the commercial marketplace. Reorganization of the division in 1989 has shifted resources to building the commercial systems integration business into a major contributing

entity. To date, BCS' commercial activity has been limited to key vertical market niches such as aerospace and state and local government. However, the company has recently branched out into new areas, including transportation, electronics, and utilities.

The president of BCS has always reported directly to the president of Boeing. A 1989 reorganization of the defense and aerospace businesses within Boeing reduced the number of executives who report directly to the Boeing president. The current Boeing organizational structure is shown in Exhibit BCS-3. This structure allows the BCS division even more visibility within the corporate structure and shows the high-level strategic importance of BCS, both internally within Boeing and externally as a commercial enterprise.

EXHIBIT BCS-3



#### 4. Markets Served

Approximately 85% of BCS' 1989 noncaptive revenue was derived from the federal government, and 15% from commercial clients. Noncaptive revenue excludes that derived from the parent company, which is BCS' principal customer. Within the government, BCS pursues business—including SI, support services, and telecommunications business—for the Department of Defense, NASA, and various civilian agencies. Commercial revenue comes primarily from the manufacturing, energy, and transportation industries, state and local government, and from cross-industry applications. New vertical markets, including pharmaceuticals, financial services, and electronics, are evaluated in response to market demand.

BCS operates six major data centers. Four of the data centers—Kent, WA; Wichita, KS; Philadelphia, PA; and Huntsville, AL—principally support Boeing operations at those locations. The fifth, located in Bellevue, WA, supports both Boeing and commercial customers, and the sixth, in Vienna, VA, serves the federal government. All centers and offices are linked by one of the largest privately owned telecommunications networks in the world.

## 5. Recent Events

To build on its success in the federal market and to increase federal business, Boeing has expanded its Vienna, VA headquarters and added 12 additional executive positions. While the additional building is being constructed, BCS has temporarily leased additional office space in nearby Reston, VA. BCS is currently pursuing two major SI contracts:

- HUD's Integrated Information Processing Services (HIIPS)
- The Department of State Telecommunications Network (DOSTN)

In a move to increase its penetration of the European market, BCS has signed a new distribution agreement with GEC, England's largest engineering and electronics company. The agreement covers BCS' Product and Process Document Management (PPDM) software. Tandem Computers is also a participant in the arrangement.

BCS also recently won a contract to maintain the Commonwealth of Pennsylvania's data communications network. The three-year contract was awarded through a recompetition of an earlier contract won by Boeing, which included the design and implementation of the multi-agency state network.

## 6. SI Organization and Staffing

Exhibit BCS-3 illustrates the Boeing organization. BCS is divided into two major groups: the Information Services group, which handles systems integration for external customers and is further divided into Government Business Development and Commercial Information Services; and the Boeing Support Group, which handles systems integration for the Boeing Company.

The Information Services group provides strategic systems development and integration products and services to government and commercial clients. The division also provides network integration and management products and services, document and image management products and services, remote computing services (including supercomputing), systems operations services, consulting services, packaged software products, and education and training services. Approximately 3,000 employees are active in this group, and further resources are drawn from the Boeing Support Group and other Boeing divisions.

Over 7,000 employees in the Boeing Support Group directly support the computing and telecommunications needs of the Boeing Company and its operating divisions. The Advanced Technology Center, which performs research in areas including artificial intelligence, software engineering, and high-speed processing, is part of the Boeing Support Group.

## 7. SI Business Objectives

INPUT believes that BCS' strategic direction will be closely aligned with its areas of strength. Specific emphasis will be placed on opportunities requiring extensive systems and network integration, large computing facilities, and highly sophisticated, high-speed systems. The company will support these services by developing integration tools in areas such as network management and document/image management.

In shifting its attention from its traditional business areas, BCS has taken several steps:

- BCS has refocused its concentration from timesharing (a flat business) to systems integration, network integration, network management systems, document management systems, systems operations, and other areas of strategic importance to customers' businesses.
- BCS is emphasizing a value-added systems integration approach that also serves as an umbrella for its other products and services.
- BCS is focusing its software development efforts on value-added integration and management software that is not currently available in the marketplace—for example, the Product and Process Document Management (PPDM) software and the Integrated Network Management System (INMS) software.
- BCS is developing key alliances in product development and marketing with hardware vendors, telecommunications carriers, and consultants.
- BCS has instituted organizational changes to increase the visibility of the Information Services group within the company and to facilitate expansion into new markets.
- BCS has realigned its commercial systems integration activities to pursue and penetrate this growing market.

## 8. SI Capabilities Summary

Boeing's capabilities lie primarily in systems and network management and integration, systems operations, project management, and computer services. As a systems integrator for the Boeing Company, BCS has designed and implemented the Boeing Telecommunications Management Center (TMC).

In late 1987, Boeing had five network control centers. Today, they are all consolidated in one centralized, real-time network management center. During 1989, the TMC monitored 17 complex networks, 13 major sites, 4,000 data circuits, 30 strategic switches, 110,000 switched lines, and 11,900 interconnect trunks. BCS is also completing a \$100 million modernization of Boeing's nationwide private voice network.

BCS' array of proprietary software products also increases its ability to capture SI work. For example, the Boeing Integrated Network Management System (INMS) caters to the varying technologies of many different vendors, so customers can use INMS with their existing baseline equipment as well as with new equipment. The Boeing Product and Process Document Management System (PPDM) can serve as a base for complex systems integration and management that includes large-scale image processing. Boeing's Contract Management Family includes proposal pricing, project management, estimating, scheduling and program history components, and also supplies the Executive Information Services (EIS) application development language tool. The company's line of scientific and engineering software also supplies customers with tools that enhance their system capabilities.

Boeing also remains active in traditional timesharing and supercomputer services. The company's MAINSTREAM Access services offer scientific and engineering customers a broad range of computing capabilities, including CRAY XMP/24 supercomputing processing, CDC CYBER and IBM systems processing, and gateway access service. These services are supplied through Boeing's data centers in Vienna, VA and Bellevue, WA. BCS also provides customers with facilities management services.

BCS strengths include requirements analysis and definition, systems architecture and design, facilities planning and management, network design and management, education and training, and project management.

### **9. SI Capabilities Evaluation**

BCS has extensive capabilities dispersed throughout its organization. A 1989 reorganization resulted in a staff dedicated solely to commercial systems integration opportunities. This indicates the company's serious intent to establish a strong presence in the commercial systems integration market.

#### **a. Consulting/User Requirements Analysis**

BCS has strong technical and project management skills in consulting, particularly in the design and use of supercomputers, the design and management of large data center operations and networks, the management of documents, and the integration of manufacturing systems. The

company does not bill itself as a business or management consulting firm per se, but it does provide these services as part of a total systems integration assignment.

#### **b. Design/Integration**

BCS has excellent skills in the design and integration of complex systems, including centralized and decentralized information processing as well as telecommunications that serve a large number of geographically dispersed users. Boeing's base of computer and telecommunications equipment is quite diverse. In 1989 the company had approximately 84,000 computer workstations, 500 minicomputers, and 50 mainframes running on a multitude of local- and wide-area networks. The Boeing communications network is monitored through a central Telecommunications Management Center (TMC) that encompasses 17 complex networks and 13 major sites.

#### **c. Project Management**

BCS has developed a proprietary project management system that is comprehensive and is geared to large, complex projects. The Boeing Company's success in the commercial airplane business is due in large part to its skills in complex project management.

#### **d. IS Hardware**

BCS neither develops nor manufactures IS equipment. Over the years the company has worked with a multitude of vendors and has developed methods to objectively screen and select the best vendor for a particular job. Few organizations are able to work as successfully with large systems as BCS. BCS has developed extensive skills and expertise in implementing both mainframe-based systems and complex distributed networks.

#### **e. Communications Hardware**

While not a manufacturer of communications equipment, BCS has a solid base of knowledge in its application. The company has worked with a multitude of vendors and has developed methods to objectively screen and select the best vendor for a particular job. The company has developed and managed extensive networks both internally and for clients.

#### **f. Software Development**

BCS has a broad skill base and wide experience in software development. The company's present emphasis is on software that adds value to its systems and network integration work. Examples include the Inte-

grated Network Management System (INMS) and the Product and Process Document Management System (PPDM). The company also continues to market specialized engineering and scientific applications and contract management software.

#### **g. Application Software**

As noted in the previous section, BCS develops application software that adds value to its systems and network integration work.

#### **h. Systems Software**

BCS has a broad base of skills to develop systems software and has developed such software for use in its remote processing environment. It does not currently develop and market packaged systems software for use on client systems.

#### **i. Education, Training, Documentation**

BCS has strong skills in education and training, with a large organization dedicated to providing training services for Boeing staff and as a commercial offering. In addition to packaged courses, BCS will design courses to meet specific client needs.

#### **j. Service and Repair**

BCS provides service and repair to the corporation. As part of a systems integration and operations project, BCS will manage maintenance services for clients.

### **10. SI Strategic Alliances**

Several recent strategic alliances, summarized in Exhibit BCS-4, are indicative of BCS' short- and long-term focus.



EXHIBIT BCS-4

**BCS Strategic Alliances**

Vendor	Purpose
Tandem Computers	Document management software
NEC	Integration Network Management Software (INMS)
IBM	SI partner
U.S. West	Network integration partner
Honeywell	High-speed circuitry and supercomputer development
Scientific Computer Systems	Operating systems software

- Through an alliance with Tandem Computers, Inc., BCS is developing a strategic document management product (Product and Process Document Management System—PPDM) that will run on the Tandem platform. Target markets include manufacturing and pharmaceuticals, as well as other vertical markets where Tandem or Boeing have strength, including transportation, finance, and utilities. The Boeing PPDM software will be marketed by the Tandem sales organization.
- A distribution agreement with GEC, the U.K.'s largest engineering and electronics company, for Boeing's PPDM software was recently signed. The contract is a three-way agreement between Boeing, Tandem Computers Inc., and GEC Computer Services, a division of GEC, which will have sublicensing rights to sell PPDM within its parent corporation. GEC will also have the right to sell the English language version of PPDM, either directly or through agents, to the European Economic Community.
- Through an alliance with NEC, network management software is being developed that provides interfaces to NEC's telecom products. Under the terms of the nonexclusive agreement, Boeing will retain all rights to its network management software. The software will be provided to NEC in addition to documentation, maintenance, and consulting support. NEC will combine the Boeing software with its own NEAX 2400-IMS PBX products under the name VISION Integrated Network Management System (VISION-NMS) and will market the product to corporations in the United States and Australia.



- BCS also has an alliance with IBM for joint bids on projects where BCS can add value in systems and network management and integration. IBM was a subcontractor to Boeing on a contract to design and implement a data communications network for New York City.
- BCS has a memorandum of understanding with US West Communications that formalizes a strategic alliance between the two firms to provide network integration services to medium- to large-sized business throughout the 14 states serviced by US West.
- An alliance with Honeywell will provide access to Very-High-Speed Integrated Circuit (VHSIC) technology for specialized applications.
- BCS has an agreement with Scientific Computer Systems to provide operating system software for the SCS-40 near-supercomputer.

## 11. SI Marketing Strategy

INPUT believes that BCS will place increased emphasis on integration projects that are of high value (over \$5 million) and that have a requirement for complex computing and network systems. This will enable it to leverage its strengths. BCS has significant strength in a number of areas that include systems and network design, and integration and management of large, complex projects. Systems integration will serve as an umbrella under which will be marketed value-added tools, products, and services such as the Integrated Network Management Software (INMS) and the Product and Process Document Management System (PPDM).

The company will round out its expertise in technology, project management, and systems/network management and integration by utilizing a wide range of development and marketing teaming and alliance partners, including computer/telecommunications hardware manufacturers, telecommunications manufacturers and carriers, and consultants.

Boeing will target vertical markets including manufacturing, utilities, transportation, pharmaceuticals, and federal, state and local governments, as well as other vertical market opportunities that are identified by alliance partners.

Exhibit BCS-5 summarizes BCS' approach.

## EXHIBIT BCS-5

**BCS Marketing Strategy**

- Target industries
  - Federal
  - Manufacturing
  - Telecommunications
  - State and local government
  - Transportation
  - Pharmaceuticals
  - Others as identified by alliance partners
- Target cross-industry markets
  - Systems management and operations
  - Network management and integration
  - Document management/image processing
- Large project focus
- Focus on teaming and alliances

**12. SI Customer Base/Specific Projects**

During 1988, BCS was awarded the following contracts:

- In December 1988, it was announced that BCS and AT&T Federal Systems Division had won a ten-year federal telecommunications system (FTS 2000) contract for the General Services Administration (GSA) to upgrade the entire federal government telephone system to a digital voice, data, and video communication network. The new system will serve about 1.3 million federal government employees in about 3,500 locations throughout the U.S., Puerto Rico, and the U.S. Virgin Islands.
- BCS won a contract to design and implement a data communications network for New York City. The network will streamline and reduce the costs of the city's information services. BCS will install, test, and maintain the network, as well as provide network management training to users. IBM is a subcontractor to BCS on this project.
- In July 1988, BCS was awarded a five-year contract from the Department of Labor's Bureau of Labor Statistics to provide networking, remote computing services, technical support, and training.

- In June 1988, BCS was awarded a contract by the Internal Revenue Service to provide remote computing and technical support for several computer-based systems, including the Budget Preparation System and the Inventory Control and Distribution System, used to design, print, distribute, and stock all federal income tax forms.
- BCS, teamed with Booz-Allen & Hamilton, was selected to provide the U.S. Army Intelligence Agency with supercomputing architecture support. The BCS team will install additional computing equipment and networking, and will provide systems support. The team also will develop intelligence modeling tools and application software for the Army.

Other contracts include the following:

- Boeing implemented a \$38 million supercomputer network for the State of Alabama. In its first year of operation, the system achieved an 80% usage rate, with most customers coming from business and academia. This experience strengthened BCS' qualifications to bid on other SI projects that involve supercomputers.
- During 1987, BCS was selected to provide the Technical and Management Information System for NASA's space station program. This contract includes the design and implementation of an evolutionary engineering data base system that will operate with NASA Centers, contractors, and eventually other governments as the space station is developed and implemented. This program will add to BCS' list of strong technical credentials.
- Also during 1987, BCS was awarded an eight-year contract from the U.S. Army Forces Command to design and install a management information system for its headquarters operations at Fort McPherson near Atlanta, GA. BCS will integrate the new system with existing Army computer systems and provide local-area networks, 1,200 workstations, and training services.
- BCS has designed, installed, and is operating a nationwide telecommunications network for NASA. This integrated network provides voice, data, facsimile, and full-motion video capabilities.

### 13. Summary and Future Directions

BCS has various strengths and weaknesses, some of which are summarized in Exhibit BCS-6. It has shown particular expertise in those disciplines related to high technology and network management and integration, including:

- Systems design, integration, and management
- Network design, integration, and management
- Document management
- Image processing
- Artificial intelligence
- Supercomputing
- Facilities management and systems operation
- Program planning, management, and control
- Education and training

## EXHIBIT BCS-6

**BCS Summary****Capabilities**

- Extensive technical expertise
- Broad range of skills and resources
- Extensive project management expertise
- Strong teaming and alliance relationships
- Strong reputation in federal marketplace
- Ability to handle large projects

**Limitations**

- Federal/internal orientation reputation
- Limited commercial track record
- Limited business consulting capabilities

Generally, BCS has demonstrated excellent results in dealing with the government sector and has begun to achieve success with the private sector. The limitations it must overcome include:

- BCS does not currently have a strongly developed image in the private sector. It is frequently viewed as oriented primarily to government high-technology environments. BCS has, to some extent, struggled with its commercial business, as it has attempted to eliminate its federally- and internally-oriented image. It will need to continue to focus on convincing customers that it has a long-term commitment to the commercial information services business. Recent company reorganization has strengthened the visibility of commercial business within Boeing and BCS.
- While BCS has strong technical consulting skills in focused areas, it is limited in general business consulting capabilities.

- BCS, like other vendors with strong federal backgrounds, must focus on transforming its contracting, management, and pricing practices to meet the requirements of commercial customers. This is not an easy transition for a firm with a strong federal heritage.

INPUT believes that BCS will place its primary efforts on leveraging the technological and program management disciplines it has developed through implementing its federal government business and applying those skills in key vertical markets such as manufacturing and state and local government. BCS will be opportunistic in looking, often with alliance partners, for large contracts that utilize its systems and telecommunications development and management expertise.



## COMPANY PROFILE

Bull HN Information  
Systems, Inc.

**1. Key SI Contacts**

Ron Cuneo  
President/Chief Executive Officer  
Technical Services Operation  
U.S. Marketing Sales and Services  
Bull HN Information Systems, Inc.  
Technology Park  
Billerica, Massachusetts 01821-4199

[Federal SI]

David Herter  
Vice President  
Technical Services Operation  
U.S. Marketing Sales and Services  
Bull HN Information Systems, Inc.  
Technology Park  
Billerica, Massachusetts 01821-4199

[Commercial SI]

**2. Description of Principal Business**

Groupe Bull is a major European ADP equipment manufacturer, known worldwide as a vendor of information processing equipment and services. The U.S. Marketing Sales and Services organization, Bull HN Information Systems, Inc. (Bull) is the former Honeywell computer company. As Honeywell, Inc., it was well known for its computer and communications equipment and processing services, and for its professional/technical services. The current U.S. organization, although wholly owned by the French Groupe Bull, has been chartered with independent American management; thus, it can properly be included in restricted "buy American" procurements with Groupe Bull participating in its profits.

As an SI services vendor, Bull offers a complete range of products and services required to be a full-service SI vendor. Seeking primarily functional markets, coupled with selected industry targets, Bull's key offerings center on UNIX-based distributed processing systems and on-line transaction processing systems.

Bull (and before it, the original Honeywell corporation) has competed in the SI marketplace for more than 15 years. Like most of its competition, however, Bull did not address SI as a separate discipline and market until the market demanded it.

Current (1990) revenue for Groupe Bull's systems integration activities, exclusive of the Honeywell Federal Systems, Inc. revenue, is \$150 million. Its SI business currently is split evenly between mainframe-based system and distributed systems; its current SI contract values break out as shown in Exhibit BUL-1.

## EXHIBIT BUL-1

**Distribution of SI Contract Values at Bull**

Component	Percent of Contract Value	
	Commercial	Federal
Equipment	50	60
Packaged Software	20	20
Professional Services	30	20

**3. Competitive Position**

Bull gains major advantage from being recognized as a worldwide provider of a full set of SI products and services. Bull has built a reputation as a provider of quality products and services contributing to customer satisfaction.

Clearly deciding to be a full-service SI services vendor, Bull offers all the requisite SI capabilities that INPUT has defined as the base set of SI capabilities. In addition, Bull uses alliances in nearly every area to strengthen both its capability and its responsiveness to its customers.

**4. Markets Served**

Bull's principal targets (70%) in the SI market are functional; it also pursues selected vertical market targets (30%), as shown in Exhibit BUL-2.



## EXHIBIT BUL-2

**Bull's SI Target Market Opportunities**

Vertical	Functional
Government (federal/state/local)	Networking
Retail and distribution	Multimedia
Financial services	Transaction processing
Manufacturing	Open systems—UNIX/OSF Workstations/work groups

**5. Recent Events**

Groupe Bull S.A. recently announced a massive international reorganization that includes stepped-up research and development efforts to unify the company's proprietary and UNIX platforms. The project, which had been targeted for completion in four years, is now on an accelerated schedule of two years, said Groupe Bull Chairman Francis Lorentz. Groupe Bull's R&D worldwide will be centrally budgeted and directed by Bull HN President and Chief Executive Roland Pampel.

Bull's recent introduction of its DPX/Prostation line of UNIX/486-based workstations is typical of the integration direction Groupe Bull is taking. DPX/Prostation is configured with the Bull Professional Environment (BPE), a complete desktop environment of applications and tools. Bull worked closely with the leading desktop operating system company, Santa Cruz Operation, and select applications developers—including Informix Software, Inc., Ingres Corp., and Frame Technologies—to create a fully functional system. "Bull intentionally went to these vendors because customers want popular third-party applications," said a company spokesman.

In January 1991, Bull HN Information Systems, Inc. was awarded a blanket contract by the Commonwealth of Massachusetts for the Superior Court, Department of the Trial Court of the Commonwealth, to provide computer systems to automate the Court's civil and criminal case management procedures.

In August 1990, Groupe Bull purchased Honeywell Federal Systems, Inc. (HFSI) from Honeywell, Inc. The HFSI operation, based in McLean, VA, has about 1,600 employees and did \$274 million worth of business during 1989. HFSI, now essentially a subsidiary of Groupe Bull, would be required by regulations governing foreign-owned companies to run the HFSI operation under a proxy arrangement, since the unit gets about 70% of its revenues from the Defense Department.

## 6. SI Organization

Bull's overall SI organization is headed by Ron Cuneo, President, Bull HN Information Systems. He is also responsible for the SI activities in the federal market. David Herter, Vice President of Technical Services Operations, heads Bull's commercial SI activities. The organization of Bull's SI activities is matrixed; this is to be expected in a major manufacturing organization like Bull. The division of SI responsibilities at Bull is summarized in Exhibit BUL-3.

EXHIBIT BUL-3

### Centralization/Decentralization of SI Business Functions at Bull

Responsibility	Commercial	Federal
Strategy and long-range planning	C	C
Marketing and promotion	C	C
Account management and sales	D	B
Contract review and approval	C	C
Project management and control	B	B
Implementation and development	B	B
Hardware and software acquisition	C	C
Systems operations	B	B

C=Centralized, D=Decentralized, B=Both

Bull's SI capabilities are primarily concentrated in the area of application systems development and implementation, as shown in Exhibit BUL-4.

Bull's SI staff ranges between 425 and 625, according to the distribution presented in Exhibit BUL-5.

## EXHIBIT BUL-4

**Distribution of Staff Capabilities  
to SI Activities—Bull**

Capability	Percent
Management, strategy and planning	5
Legal support/contract administration	3
Project management	7
Systems development/implementation	60
Hardware/software evaluation/acquisition	10
Hardware engineering	5
Sales	10

## EXHIBIT BUL-5

**Distribution of Bull's SI Employees**

SI Sector and Status	Number
Commercial SI—full-time employees	100-200
Commercial SI—additional employees	50
Federal SI—full-time employees	200-300
Federal SI—additional employees	75

**7. SI Business Objectives**

Bull's pursuit of SI projects is focused sharply on profits and responding to customer demand. A secondary objective is establishing a potential for follow-on facilities management contracts. Although not cited by Bull as motivating factors in its SI business, INPUT believes that Bull will use its SI business to maintain a satisfied customer base and leverage follow-on hardware and software sales opportunities.

## 8. SI Capabilities Evaluation

Bull offers the full range of SI services: consulting, design/integration, project management, hardware, communications products, system software, etc. In particular, Bull has strength in its on-line transaction processing and distributed information applications systems, as well as support for individual workstation and work group applications. Bull shows strength in nearly all areas, with additional strength gained from alliances, as shown in Exhibit BUL-6.

BUL-6

**Bull's SI Capabilities and Use of Alliances**

SI Capability	Strength	Alliance
Business consulting	Medium	Yes
Design methodology	High	Yes
Design/integration	High	Yes
Project management	High	Yes
Software development	High	Yes
Education/training/documentation	High	Yes
Packaged applications software	High	Yes
Packaged systems software	High	No
Standard computer hardware	High	Yes
Custom computer hardware	Medium	Yes
Communications hardware	Medium	Yes
Network management/operations	Low	Yes
Service and repair	High	No
Software maintenance	High	Yes

## 9. SI Strategic Alliances

As shown in Exhibit BUL-6, Bull uses alliances in nearly every area of its SI business. Bull uses both contract-by-contract and long-term alliances to support its SI activities under a formal alliances program. Bull's alliance partners, for example, range from British Telecom in the U.K. to Andersen Consulting in France, to Deloitte Touche in the U.S. In general, however, Bull's alliances support its SI business in the following ways:

- By broadening Bull's products and services offerings
- By satisfying customers' specific solution requirements
- By opening new markets in conjunction with "build versus buy" analyses

## 10. SI Capabilities Summary

Bull clearly offers a full range of SI products and services. Although Bull did not identify specific SI products or services that give Bull advantage over its competition, INPUT notes that Bull should gain advantage in several areas:

- A lean organization - The preponderance of staffing supports the delivery of SI products and services.
- Breadth of SI offering - Whether through in-house staff or alliance, Bull can deliver all the capabilities required for success in the SI marketplace.
- Breadth of alliances - Bull's alliances strengthen both the quality and responsiveness of Bull's SI capabilities.

Bull's wide range of services, supported by alliances, should make Bull able to support any required service needed, and demonstrate no apparent internal weaknesses in its SI offerings.

## 11. SI Marketing Strategy

Bull's dominant marketing strategy is to pursue functional targets. Stressing connectivity through open systems and promoting individual and work group productivity products, Bull concentrates on doing a few things very well. Bull's market targets, both vertical and functional, are summarized in Exhibit BUL-2.

Competitors - Bull's primary competition, in both commercial and federal SI markets, is summarized in Exhibit BUL-7.

## EXHIBIT BUL-7

**Bull's Primary Competition  
Commercial and Federal**

Commercial	Federal
Consulting firms	CSC
EDS	EDS
IBM	IBM
Regional software/ services vendors	McDonnell Douglas Unisys

- Positioning - Bull positions itself as a full-service SI services provider by offering all the required capabilities; it can perform any required service, whether in-house or through one or more of its alliances. Bull focuses on providing quality products and services while it maintains its solution orientation.
- Promotion - Bull uses all the forms of promotion identified by INPUT in its 1990 survey: public seminars, direct mail, advertising in general and trade/industry publications, television advertising, and client referrals—with varying levels of effectiveness. Bull finds advertising in trade/industry publications to be highly effective, along with word-of-mouth client referrals. Public seminars, television, and general business advertising are reported to be only moderately effective. Direct mail is relatively ineffective for Bull.

**12. SI Customer Base**

Groupe Bull has systems integration experience in Europe that it can leverage to advantage because of its stature as a worldwide equipment vendor. Typical of its broad experience are the projects listed in Exhibit BUL-8. They represent the range of technologies that Groupe Bull—as a full-service systems integrator—provides, and the range of clients and applications it is capable of addressing.

## EXHIBIT BUL-8

## Typical Groupe Bull SI Projects

Client	Project	Technologies
Ansaldo (Italy)	Complete plant automation	UNIX TCP/IP MRP II X.25 Multivendor equipment
Dept. Social Services (U.K.)	Largest operational European OSI network	DSA/OSI X.25 ICL GCOS 6
Post Office (France)	Workstation network for Financial Services Department	UNIX LAN X.25
Superior Court (MA)	Automation	UNIX Multi-vendor equipment

## 13. Summary

INPUT identifies Bull as a vigorous competitor in the SI marketplace, since it has chosen to be a full-service SI vendor by developing all the required SI capabilities either in-house or through alliances. It is apparent in its wide array of alliances that in promoting quality and responsiveness, Bull intends to grow with the SI market.

Groupe Bull is well positioned to be a worldwide systems integrator serving the needs of its global clients. The recent acquisition of Honeywell Federal Systems, Inc. enhances that capability still further. The emphasis on systems integration is in line with the overall company strategy of expanding its role from that of an equipment vendor to that of a full-service provider in the information technology industry.

The systems integration orientation will strengthen Group Bull's image as a problem solver and business partner among clients and prospects. The move into systems integration is viewed as positive internally, since the systems integration market is a clearly defined, maturing market that has been profitable for the vendor community.





## COMPANY PROFILE

---

### Cincinnati Bell Information Services (CBIS)

#### 1. Key SI Contacts

Mr. Mike Schuster  
President  
CBIS Systems Integration Group  
12750 Fair Lakes Circle  
Fairfax, VA 22033

Mr. Mark Rohde  
Vice President  
National Government Market Development  
12750 Fair Lakes Circle  
Fairfax, VA 22033

Mr. Ray Zoeller  
Vice President  
Financial Services Market Development  
12750 Fair Lakes Circle  
Fairfax, VA 22033

Ms. Sally Shuler  
Vice President  
Communications Market Development  
600 Vine Street  
Cincinnati, OH 45202

#### 2. Description of Principal Business

Cincinnati Bell Systems Integration Group is an operating division of Cincinnati Bell Information Systems (CBIS). CBIS is an unregulated entity of Cincinnati Bell. Cincinnati Bell is part of the Ameritech regional Bell operating company.

Cincinnati Bell's principal business is the provision of (voice and data) telecommunications services in the state of Ohio. Principal operating entities include Cincinnati Bell Telephone, Cincinnati Bell Information Systems, MATRIX Marketing, Cincinnati Bell Directory, Cincinnati Bell Long Distance, and Cincinnati Bell Supply.

The company notes in its annual report that the systems integration group was formed to supply a wide range of data processing services to the federal government and its prime contractors, and to financial institutions.

Systems integration services have been provided to the federal market for eleven years and to the commercial market for eight years.

### 3. CBIS Competitive Position

Company documents do not specifically identify revenues for systems integration. However, CBIS's 1990 revenues for information systems and telecommunications services, which include systems integration, were approximately \$400 million.

Following the breakup of AT&T, many of the regional companies and local service providers began to diversify into other areas. Cincinnati Bell placed emphasis on developing the expertise of CBIS and marketing a wide variety of products.

Key to CBIS' growth has been its expertise in systems development of large telephone company management systems. It has marketed the systems to domestic and international customers. From this base, CBIS began to provide systems and services to the cellular telephone industry and, subsequently, expanded into providing systems operations services to that industry. CBIS is now one of the largest providers of billing services to the cellular telephone industry.

Looking for further diversification opportunities, CBIS began expanding into new technologies such as electronic imaging, now a key focus of the company.

In the telephone industry, CBIS has become recognized as a high-quality provider of systems and services.

The company believes it has competitive strengths in a number of areas.

- It has developed expertise in the use of CASE tools and a life cycle design methodology.
- It is independent of any specific hardware or software vendor. This contributes better bottom-line, cost-effective solutions.
- It has significant experience in establishing connectivity and interoperability between various types of networks.
- It has an ability to implement multisystem network management platforms.
- It can provide true end-to-end, operating management of systems and networks.

#### 4. Markets Served

As stated in the company's annual report, CBIS' strategy is to be a leader in a few selected markets. The markets specifically targeted are shown in Exhibit CBIS-1. There is no indication that the company will be expanding into other areas in the near term.

EXHIBIT CBIS-1

#### SI Vertical Market Focus—CBIS

- Telecommunications carriers
- Federal government
- Financial services

#### 5. Recent Events

In the past year, the company made a number of acquisitions to strengthen its position in systems development and marketing. Acquisitions by the systems integration group include the following:

- Federal Information Technologies, Washington, DC.—The company specializes in local- and wide-area network management design, development, and implementation.
- Vanguard Technologies Inc., Fairfax, VA—Acquired to increase CBIS' ADP services strength in the federal government.
- OAO Corporation, Greenbelt, MD—The company has a seven-year contract with the Internal Revenue Service for automated data processing support. The contract is valued at \$350 million.

#### 6. CBIS Organization

CBIS is divided into three operating divisions: Communications Systems Group (CSG), Systems Integration Group (SIG), and CBIS Europe Group (CEG).

CSG is comprised of Telecommunications Information Systems, Mobile Communications, and CBIS International. Its clients include interexchange carriers, local exchange carriers, independent telephone companies, regional Bell operating companies, foreign postal, telegraph and telephone companies, government agencies, switch manufacturers, cellular carriers, and paging providers.

SIG is comprised of the Systems Engineering Division, Image Management Division, Systems Management Division, Strategic Management Consulting Division, Network Engineering Division, Government Integration Systems, and Commercial Systems Integration. SIG's clients are state and national governments (and their prime contractors), financial services institutions and communications providers.

CEG markets the full range of CBIS products and services in Europe. Its markets are European postal, telegraph and telephone organizations, mobile telecommunications providers and their resellers, telecommunications equipment manufacturers, and providers of corporate networks and new competing networks.

## 7. SI Objectives and Revenues

Building on a base of \$400 million in 1990, significant growth is expected over the next five years. CBIS expects its commercial SI business to grow at 22% per year and its federal revenues to grow at 16%. The company reports that 80% of its commercial revenues are derived from new clients. In the federal sector, only 20% of revenues are derived from new clients.

Of the total revenue, 60% is derived from contracts performed as a prime contractor. The other 40% is from subcontracting to other, major SI vendors. The company reports that its margins on commercial contracts are increasing and that margins on federal contracts are decreasing.

Many systems integrators report that they realize the greatest margins on custom software development. For CBIS, custom software development provides less of a return than customized hardware and software packages. The difference reflects CBIS' significant investment in systems for the telecommunications industry. CBIS also indicates a high margin on project management. The company reports low margins on standard hardware and software.

## 8. Internal SI Capabilities Evaluation

The company reports that it currently has in-house capability to address a broad range of systems integration requirements. As would be expected of a communications company, CBIS considers communications-related knowledge of the greatest value. All other areas of knowledge are rated as of medium value.

## 9. SI Strategic Alliances

The company establishes alliances primarily for the purpose of enhancing skills, capabilities, and resources to penetrate new markets, and to complement its strengths. In all cases, alliances are used to improve CBIS' probability of winning an opportunity or penetrating a market.

The company utilizes both long-term agreements and agreements related to a specific contract. Long-term agreements are used primarily to help penetrate new markets. Short-term contracts have traditionally been used to satisfy federal contract requirements.

## 10. SI Marketing Strategy

As previously noted, CBIS focuses on three vertical industries: telecommunications, the federal government, and financial services.

To determine key target markets, CBIS looks for areas that are heavily information-based, solution-oriented, and mission/service-focused.

The company's marketing strategy is fairly traditional. In the federal government market, 90% of CBIS' opportunities result from response to RFPs. Only 10% result from leveraging existing clients. In the commercial market, 80% of the company's business is developed through proactive marketing. Only 10% results from client references and 10% results from responding to specific requests.

The company positions itself as an independent organization skilled in the full range of system life cycle activities. It has a wide range of expertise in telecommunications, data processing, imaging, systems engineering, and systems management.

Services are marketed primarily through direct mail, public seminars, client referrals, and active sales efforts. Client referrals and direct sales are the most successful. The company indicates that 80% of its new business results from direct sales efforts.

The company's key competitors are shown in Exhibit CBIS-2.

EXHIBIT CBIS-2

**Key SI Competitors**

Federal	Commercial
EDS	Andersen
CSC	Price Waterhouse
SAIC	EDS
	PRC

**11. SI Customer Base**

The company has been providing systems integration services for 18 years and currently has more than 50 clients. Of the total, 40 are from the federal sector. CBIS reports that commercial contracts range in value from \$1-3 million and federal contracts range in value from \$5-15 million.

In the commercial sector, 50% of CBIS' revenues result from the provision of professional services. Revenue from equipment and packaged software is equally split at 25% each. In the federal sector, the company reports that revenues from the provision of equipment and professional services each represent 25%. Packaged software represents 10%. The company has not identified the source of the additional 40%.

Unlike other systems integration vendors, CBIS reports that its projects are evenly split between mainframe and distributed systems, at 50% each. Other vendors report a much higher percent for distributed systems. The distinction is a reflection of CBIS' background and expertise in developing large, complex systems for the telecommunications industry.

The company reports that a number of projects are indicative of its broad range of capabilities. The projects identified are the following:

- Treasury/IRS—ADP Support Services
- USDA/FHA—IRM Support Services

- HUD—Facilities management, subcontractor to Martin Marietta
- Justice—Systems Development Life Cycle task order
- State of Virginia Vital Records
- Kelly Services—Document imaging system
- American Family Life Assurance Company—Document imaging system
- Canadian Imperial Bank of Commerce
- Central Fidelity Bank
- Bay Banks
- Comerica Bank
- First National Bank of Chicago
- Frost Bank—Check imaging system
- National City Corporation

## **12. Summary and Future Directions**

CBIS has greatly enhanced its position to provide systems integration services to the federal government by acquiring three organizations dedicated to this market. In the commercial market, the demand for network integration expertise continues to grow. CBIS is staffed to respond to this need as it develops.

These two factors are an indication of the company's strong position as a systems integrator targeting markets in which it can provide a depth of expertise. This strategy should be effective in helping CBIS to continue to grow at or above past growth rates in the next few years.





## COMPANY PROFILE

---

### Computer Sciences Corporation

#### 1. Key Systems Operations Contacts

##### Systems Group (Federal Systems Integration)

Sterling Phillips, President  
Business Development/Systems Group  
3170 Fairview Park Drive  
Falls Church, VA 22042

##### Consulting Group (Commercial Systems Integration)

James P. Saviano, President  
CSC Partners  
One University Office Park  
Waltham, MA 02154

#### 2. Description of Principal Business

Computer Sciences Corporation describes itself as a provider of broad-based management consulting services in the strategic use of information technology; the development and implementation of complete information systems; and the provision to clients of the entire range of data processing services, commonly known as outsourcing. The firm manufactures minimal amounts of equipment, mainly in the communications area. It provides specialized, proprietary services to specific markets such as finance, health care, claims processing, network management, and income tax processing. CSC also provides remote computing services to private industry and government.

CSC is divided into four functional divisions or groups. Systems Group markets and manages federal systems integration projects; Consulting Group does the same for commercial projects; CSC Europe, as the title implies, is responsible for European system integration operations. The Industry Services Group manages CSC outsourcing and proprietary services offerings.

The company has been in the federal systems integration business for thirty years and in the commercial sector for sixteen years. Of its 26,500 employees, 4,400 are deemed to be dedicated to the SI function: 3,000 in the federal sector, and 1,400 in the commercial.

Exhibit CSC-1 includes the company's revenues for fiscal 1992, which ended on the closest Friday to March 31, 1992. Figures for the third quarter FY 1993 showed approximately the same kind of ratio of federal government to commercial revenues of approximately 57% versus 43%.

## EXHIBIT CSC-1

**Computer Sciences Corporation****Fiscal Year 1992 by Business Segment<sup>1</sup>**

Business Segment	Revenues (\$ Millions)	Percent
Systems Group <sup>2</sup>	1,212	57
CSC Consulting <sup>3</sup>	689	33
Industry Services Group <sup>4</sup>	—	—
CSC Europe	212	10

1. Fiscal year ended on the closest Friday to March 31, 1992.
2. Figure represented includes all federal agencies (DoD, NASA, and civil agencies)
3. Figure includes \$37 million in state and local government, which CSC reports as commercial revenue.
4. Not reported as a separate entity in FY1 1992 CSC Annual Report. Listed in the report's general description of operations as representing 39% of federal and commercial revenues.

CSC did not break out outsourcing revenues as a separate category in its 1992 Annual Report. It did, however, provide the figure of 39% as the percentage of both federal and commercial revenues generated by outsourcing. INPUT estimates that outsourcing and related services actually represents approximately 50% of CSC commercial revenues. With the \$3 billion, 10-year outsourcing contract signed with General Dynamics in fiscal 1992, as well as its stated intention to increase its marketing effort in this area, that percentage is likely to remain constant or increase.

As illustrated in Exhibit CSC-2, the company states that its SI revenues for FY 1992 were \$551 million and it estimates revenues for FY 1993 at up to \$700 million. The breakdown between federal and commercial business respectively is \$465 million/\$86 million (FY 1992); \$500-600 million (est./FY 1993)/\$100 million (est./FY 1993).

## EXHIBIT CSC-2

## Computer Sciences Corporation

## Systems Integration Profile

	FY 1992 Revenue (\$ Millions)	FY 1993 Revenue/Est. (\$ Millions)	Employees
Federal	456	500-600	3,000
Commercial	86	100	1,400
Totals	542	600-700	4,400

The average commercial contract is approximately \$1.5 million; the average federal contract is approximately \$250 million. Contract values in both sectors have been increasing and profitability in both sectors has been stable, according to CSC management, with commercial profitability averaging around 13% and federal project profitability at approximately 7%.

### 3. Competitive Position

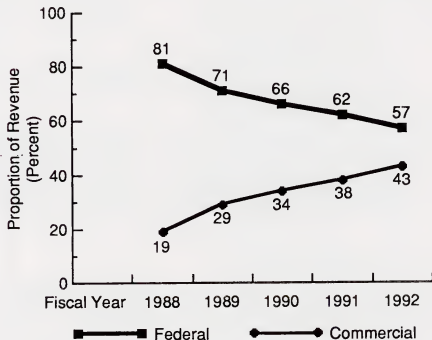
CSC is an aggressive company with an excellent track record. During the last three recession years, the firm has achieved growth in both revenues and profitability.

In recent years, the CSC award rate has been consistently between 55% and 60%. 1992 was no exception, with an award rate of 55%. This is all the more impressive when measured against the fact that the firm has made a concerted effort during this period to reduce the federal business (as a percent of revenue) on which the firm was founded and dramatically expand its commercial business. A lowered award rate, slower growth, and diminished profitability would not be an unreasonable expectation during such a transition. Clearly, however, CSC management has managed the transition skillfully.

In 1987, when CSC was almost exclusively a federal vendor, the firm announced that it would attain 50% of its profits from commercial business by 1992, based on increasing its commercial revenues to 40% of the total. While CSC does not break out profits by operating groups, the firm has exceeded its 1992 goal, with 43% of its revenues generated by commercial accounts. As illustrated in Exhibit CSC-3, the firm has done so in a steady, methodical progression over the course of its five-year plan.

## EXHIBIT CSC-3

## Computer Sciences Corporation

Change in Federal versus Commercial Revenue:  
FY 1988 through 1992

CSC has followed an extremely prudent, well-balanced marketing effort, which has allowed it to both "weather" the recession and emerge into a recovering economy with enormous financial strength. A significant effort in outsourcing over the last three years has allowed the firm to take advantage of the one sector of the IS industry which has seen significant growth.

That outsourcing effort culminated in November 1991 with the signing of the largest contract ever written: a \$3 billion, 10-year agreement with General Dynamics. Under that agreement Computer Sciences will supply its aerospace and defense units with data center management, applications development, and network and client/server operations.

While CSC has clearly spent time and effort developing its outsourcing business through its Industry Services Group, it has by no means been idle in positioning itself for its next round of growth in the systems integration market. It appears to have anticipated well both the technology it will require and the business services it will have to provide to achieve a leading position in the commercial SI sector.

Exhibit CSC-4 provides an overview of factors that will continue the CSC drive into the commercial market.

## EXHIBIT CSC-4

**Computer Sciences Corporation****SI Industry Commercial Leadership Elements**

- Marketing-oriented senior management
- Market-responsive technology
  - J-CALS/E-CALS
  - CSC Intelicom acquisition
- Front-end focus: "business re-engineering"
- Substantial capital to drive efforts
  - Technology development
  - Demonstration centers

First and foremost, CSC management is clearly marketing-oriented. While it is difficult to say that management started developing its out-sourcing business in anticipation of the recession that quickly followed, it is most likely that opportunity and an instinct for diversification drove the decision to pursue the business in anticipation of recession and the likely jump in business that the sector would experience.

Second, CSC technology appears to anticipate market requirements well. J-CALS (Joint-CALS), the basic document-management architecture for which CSC was awarded a \$744 million dollar DoD contract, provided a funded development effort for which the firm is now realizing significant commercial potential. An E-CALS (Enterprise-CALS) version is meeting a strong commercial reception in firms ranging from Caterpillar, Rockwell, and General Dynamics to Merck, 3M, and Pacific Bell. CSC no doubt envisioned expanding J-CALS from DoD to commercial concerns with a need to tie into the system. At that level of user acceptance, the push into the general commercial market would be considerably easier.

The acquisition of the telecommunications firm Intelicom in late 1991 bolstered the CSC position in large-scale information systems. This is a leading-edge marketing area previously identified by INPUT as a necessary area for SI vendor internal development.

The 1992 Computer Sciences Annual Report also addresses the concept of "re-engineering," not as a technical reworking of mainframe systems into a distributed processing network, but as a "front-end" business consulting concept. CSC is using it as a focus to capture the business process con-

sulting contracts that are integral to major commercial SI contracts. For the past two years, CSC Index has been conducting the CSC Exchange, a week-long forum for senior business and information systems executives which, in addition to a variety of technical areas, covers a number of proposals to increase productivity in vertical markets identified as leading growth areas. The session attracted 1,135 senior executives from more than 500 organizations—nearly double the previous year's figure.

CSC has also begun constructing demonstration centers patterned after the Arthur Andersen model. With CSC's financial resources and marketing savvy, Andersen is, without a doubt, keeping an eye on this activity.

The only negative area in the CSC picture is CSC Europe. Recession and organizational problems have left revenues flat for the past two years and produced the only loss for the organization.

#### 4. Markets Served

CSC has expanded and diversified its once parochial expertise to encompass a wide range of vertical and functional markets. It has done so primarily over the last five years via an aggressive course of acquisitions which, by and large, have been wisely chosen. The list of CSC vertical market expertise and functional skills (illustrated in Exhibit CSC-5) matches well with INPUT's high growth industry projections.

The horizontal/functional experience listed has been gained primarily through CSC federal projects. But the company has been shrewd in its handling of technology and its strategies for carrying it over into the commercial sector.

On the commercial side, CSC Partners provides vertical market expertise in manufacturing, distribution, finance, insurance, retail, publishing, utilities, and state and local government. Cleveland Consulting adds depth in consulting in logistics and operations management. Through Cleveland Consulting, CSC acquired Paragon Consulting Group, a Dallas-based firm specializing in operations management consulting services to food and consumer products manufacturers. The firm has performed projects for such clients as Frito-Lay, Coca-Cola, Pizza Hut, and Taylor Instruments.

CSC Index (acquired in 1988 for \$30 million) is a leading consulting firm to major U.S. and European companies. It specializes in the strategic use and management of information technology. Butler Cox, a London-based information technology management consulting firm acquired in 1991, was merged into Index. It is also Index, as previously mentioned, that spearheads CSC's seminar/marketing effort, CSC Exchange. In fact, it may be Index that is driving the firm's marketing efforts in front-end consulting.

EXHIBIT CSC-5

**Computer Sciences Corporation****SI Industry Markets**

Vertical Industry	Functional/Horizontal
Distribution	Digital image handling
Federal government	Distributed processing
Finance	Distribution/logistics
Insurance	Facilities management
Manufacturing	Management systems
Publishing	Networking
Retail	Office automation
State and local government	Relational database mgmt.
Telecommunications providers	
Transportation	
Utilities	
Wholesale	

**6. CSC Organization**

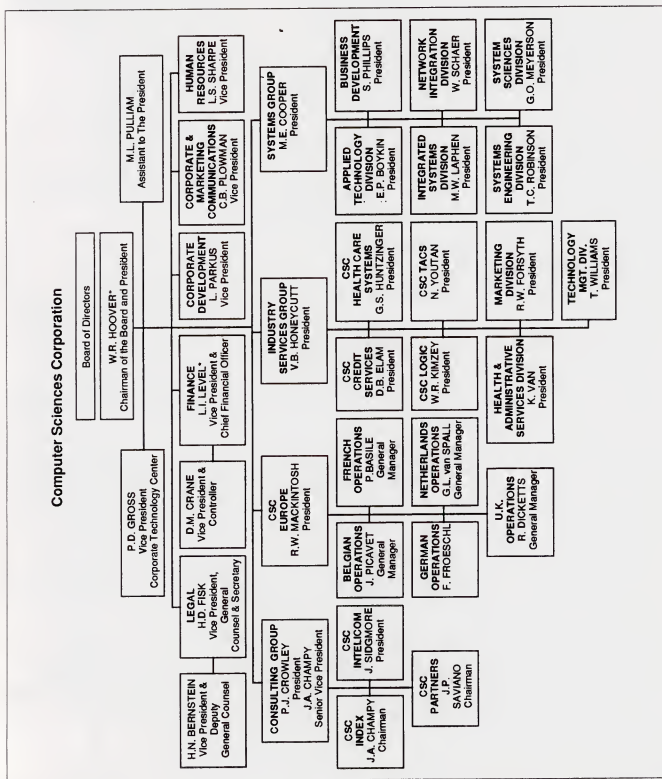
The CSC organization structure is illustrated in Exhibit CSC-6. Corporate headquarters are in El Segundo, CA. The Company provides its products and services through four operating groups, listed as separate subsidiaries:

1. **Consulting Group** is made up of three divisions that deal specifically with CSC commercial business. CSC Partners is the primary systems integration marketing and project management arm. CSC Index handles the front-end business consulting function. CSC Intelicom specializes in telecommunications functions. The division is based in Waltham, MA.
2. **CSC Europe** has offices in the U.K., Belgium, France, Germany, the Netherlands, and two in Poland (opened in FY 1992). European operations were restructured in 1992 and a new president appointed to deal with division losses and the recessionary European economic climate.
3. **Industry Services Group**, whose headquarters are in El Segundo, CA, is comprised of seven divisions servicing vertical markets with outsourcing and industry-specific services. These include insurance, health care, and consumer finance. The General Dynamics contract is handled by this group.



4. *Systems Group* is made up of six divisions that provide systems integration and processing services to the federal government. The group is based in Falls Church, VA.

EXHIBIT CSC-6





The staff allocation figures provided by CSC (Exhibit CSC-7) are somewhat atypical for the industry. The most significant item is a 15% staff allocation in the commercial division dedicated to management, strategy, and planning, which is anywhere from 50% to 150% greater than one would find in an established commercial marketing entity. Given the stated CSC intention of strengthening this area of its business, such a staff allocation is consistent with the goal. Yet its allocation to sales is more consistent with an established commercial entity, such as Andersen.

## EXHIBIT CSC-7

**Computer Sciences Corporation****Staff Allocation**

Function	Commercial (Percent)	Federal (Percent)
Management, strategy, and planning	15	5
Legal support/contract administration	1	2
Project management	10	8
Systems development/implementation	59	45
Hardware/software evaluation/acquisition	5	19
Hardware engineering	5	20
Sales	5	1

The CSC choices regarding the centralization or decentralization of business functions are totally unorthodox and at odds with industry trends. As illustrated in Exhibit CSC-8, the firm has opted for a centralization of account management and sales in its commercial sector as well as centralized project management and implementation functions. Centralized control of the sales function can be viewed as consistent with a tightly controlled marketing policy, but the strategy and long-range planning function is decentralized. This reflects the autonomy which the company continues to give to its acquisitions such as CSC Partners and CSC Index.

EXHIBIT CSC-8

**Computer Sciences Corporation****Centralization/Decentralization of  
SI Business Functions**

Function	Commercial (Percent)	Federal (Percent)
Strategy/long range planning	D	C
Marketing and promotion	D	C
Account management/sales	C	C
Contract review/approval	C	D
Project management/control	C	D
Implementation/development	C	D
Hardware/software acquisition	C	D
Systems operations	D	D

C=Centralized; D=Decentralized

On the project management and implementation side, the firm's federal division runs a more conventional, decentralized functions policy, no doubt for the speed, efficiencies, and economies that result. The opposing orientation on the commercial side is a reflection of a truly autonomous management in that subsidiary, with a distinctly technical orientation.

While one cannot criticize CSC commercial sector growth or profitability over the past several years, much of both have been due to its outsourcing efforts. Commercial SI contracts, though numerous, have been relatively small. Assuming that CSC successfully continues its movement into the commercial sector, it is likely that it will ultimately conform to a more traditional functional structure. As account wins grow larger and more numerous, the firm will simply not be able to react quickly or economically enough to project management and implementation requirements on a centralized basis, a fact that CSC has already acknowledged in its federal division.

In describing its relative profitability margins (Exhibit CSC-9) the firm differs from the profile of most other SI vendors, defining high margins from standard hardware and software and medium margins from the typically high-profitability components of consulting, custom software and

project management. The labor-intensive areas of training and education, though profitable for most SI vendors, are generally not characterized as high-margin items as described by CSC.

## EXHIBIT CSC-9

### Relative Profitability CSC System Integration Components

Integration Component	Profitability
Standard hardware and software	H
Customized hardware and software	L
Software packages	H
Consulting/design/integration	M
Custom software development	M
Project management	M
Training and education	H
Post-installation operations	L

H=High; M=Medium; L=Low

High profitability on standard hardware and software is normally associated with a vendor that uses its own products. Lower profitability on custom software would suggest that the firm will accept a smaller margin on such development and view it as paid development on which it will achieve profitability on future project application.

Another possibility lies in the manner in which CSC functions in the federal versus the commercial sectors. In the federal sector, 75% of its revenues are derived as prime systems integration contractor, with the balance from subcontracting to another vendor. In the commercial sector, only 50% of revenue is currently derived as prime contractor. The other 50% comes from supporting client-managed SI projects.

Such a high percentage of client-managed projects may well tend to skew profitability figures, as SI projects may result from outsourcing contracts or other types of projects where profitability may be derived from combined sources. However, the medium profitability on consulting/ design/ integration, as well as on project management, suggests that CSC will indeed make adjustments to its business functions, particularly as it seriously moves into the commercial systems integration sector as prime vendor on increasingly larger projects.

## 7. SI Business Objectives

As illustrated in Exhibit CSC-10, the firm views SI as a profit center in both the federal and commercial sectors. Both divisions also see response to customer demands and the strengthening of non-SI business as primary. Control of the account base is viewed as a secondary consideration by both divisions. The federal division sees a secondary benefit in follow-on facilities management contracts that is not shared by the commercial division.

EXHIBIT CSC-10

### Computer Sciences Corporation

#### SI Business Objectives

Function	Commercial P/S*	Federal P/S*
Revenues/profits from systems integration	P	P
Control of account base	S	S
Response to customer demands	P	P
Strengthen non-SI business	P	P

\*P = primary, S = secondary

## 8. SI Capabilities Evaluation

Despite the fact that CSC responses differed somewhat from most SI vendors' in the areas of profitability and business function organization, it was more consistent in the value it placed on internal capabilities (Exhibit CSC-11). Packaged software and standard hardware were given a low value rating, despite the fact that CSC derived a high profit from these items. Training, another area identified by CSC as producing high profits, was given only a medium value rating.

EXHIBIT CSC-11

## Computer Sciences Corporation

## Self-Assessed Capabilities(1)

Capability	Exists	Value <sup>2</sup>	Alliance
Business consulting	Y	H	N <sup>(3)</sup>
Design methodology	Y	H	N
Design/integration	Y	H	N
Project management	Y	H	N
Software development	Y	H	N
Education/training/documentation	Y	H <sup>(4)</sup>	Y
Packaged applications software	N	L <sup>(5)</sup>	Y
Packaged systems software	N	L <sup>(5)</sup>	Y
Standard computer hardware	N	L <sup>(5)</sup>	Y
Custom computer hardware	N	L <sup>(5)</sup>	Y
Communications hardware	N	L	Y
Network management/operations	N	L <sup>(6)</sup>	Y
Service and repair	N <sup>(3)</sup>	L <sup>(4)</sup>	Y
Software maintenance	N <sup>(3)</sup>	L <sup>(6)</sup>	Y

(1) Responses were the same for both federal and commercial divisions, with exceptions noted.

(2) H = High; M = Medium; L = Low.

(3) Federal division responded 'Y'.

(4) Federal division rated as 'M'.

(5) Federal division left blank.

(6) Federal division rated 'H'.

Perhaps the most interesting difference occurred between the federal and commercial divisions themselves. The commercial division indicated that it had no alliances to support its business consulting activity; not surprising considering the division's effort at expanding its commercial account base and its acquisitions in the past two years, combined with the critical role which this function plays in that mission. It is a function which any commercial contender must develop internally.

The federal division, on the other hand, indicated that it did have alliances to satisfy the business consulting function. Specific firms were not, however, identified.

### **9. SI Strategic Alliances**

CSC has historically been reluctant to discuss alliances. Even in the commonly accepted area of packaged software and hardware, the firm has been reluctant to suggest that it is anything but independent and free to provide the best solution to a customer's project requirement, without parochial considerations. Yet CSC has clearly demonstrated a capacity and willingness to work with any supplier necessary to get the job done.

The firm acknowledges alliances with Borland, HP, and DEC. It has worked with IBM on some notable projects and clearly has a long-term relationship with AT&T. Internationally, CSC continues to work with British Telecom via a joint marketing agreement.

CSC is certainly more willing now to acknowledge the fact of alliances, if not always the specifics. It is apparently moving to address its geographical weakness with alliances that it refers to as "logistical."

### **10. SI Marketing Strategy**

As illustrated in Exhibit CSC-12, formal marketing activity by CSC has been relatively modest, even by the conservative standards of the SI vendor community. CSC Index has been actively spearheading the firm's seminar effort in the commercial sector, relying on individual contacts made by their sales force and by the leveraging of existing accounts.

EXHIBIT CSC-12

## Computer Sciences Corporation

## Methods of Promotion

Method	Use (Y/N)	H/M/L*
Public seminars	Y	H
Direct mail	N	-
Advertising (general business pubs)	N**	-
Advertising (trade or industry pubs)	N	-
Advertising (television)	N	-
Word of mouth/client referrals	Y	H
Other: direct sales	Y	H

\*H=High activity/value; M=Medium activity/value; L=Low activity/value

\*\*The federal division reports some use of business advertising to be of medium value.

If a company is known by its competitors, CSC has defined its marketing targets in defining its principal competitors. In the federal sector, while it lists Boeing, Grumman, and SAIC—all rivals in DoD accounts—EDS is first on the list, holding position in the new federal civilian account roster to which CSC is moving. While the firm will continue to bid on military contracts, it will continue to bid aggressively in areas such as GSA (scientific and business programming support) and Bureau of Land Management (automated land and records management system).

The CSC strategy appears to be relatively straightforward (see Exhibit CSC-13). The firm will concentrate on civilian agencies in the federal sector.

## EXHIBIT CSC-13

**Computer Sciences Corporation****Competitors**

Commercial	Federal
Andersen Consulting IBM "Big 6"	EDS Boeing Grumman SAIC

The commercial sector is where CSC has made its public statement of intent to achieve its most significant rate of growth. Here too, it has defined the sector leaders—Andersen and IBM—as its primary competitors.

It will diversify its base via outsourcing. Account experience gained can then be leveraged in other commercial accounts.

First and foremost, CSC will lead with Index (e.g., CSC Exchange, etc.) and attempt to develop the front-end business consulting reputation it has historically lacked. The Andersen model—capture the front-end consulting to lock up the subsequent project award—is no doubt serving as the model for CSC. Exhibit CSC-14 summarizes CSC's marketing strategy.

## EXHIBIT CSC-14

**Computer Sciences Corporation****SI Marketing Strategy**

- Gradually shift focus in the federal sector to civilian agencies
- Copy the EDS success and diversify base via outsourcing
- Begin development in the commercial sector via acquisitions
- Leverage the account experience acquired via those acquisitions and appropriate federal experience
- Lead with front-end business consulting



## 11. Summary

Despite its 30-year track record in federal projects, the federal division of CSC has derived only 30% of its current SI business from its existing account base. The commercial division, which CSC has openly targeted for growth, is currently responsible for 70% of its SI business from existing accounts. This would explain many of the contradictions and peculiarities in the firm's responses.

Clearly, the federal division has been making a significant push away from what it perceives as a stagnant account base. The commercial division, on the other hand, has been built largely through acquisitions. Aside from the long-term commercial development sought by CSC in those acquisitions, the firm was also pursuing the rapid addition of existing commercial accounts in the short term.

The marketing models developed by Andersen and EDS have obviously served both firms well. Certainly CSC is not the first company to note and emulate them. Computer Sciences has performed significantly above industry averages over the past 3 years, demonstrating its ability to weather difficult markets. It has the financial resources to challenge both Andersen and EDS, as well as a demonstrated capacity to step comfortably outside of its federal roots. But CSC might be well advised not to compete with either on its own terms, but rather develop an approach uniquely belonging to CSC that will force competitors outside of their historical strengths.



## COMPANY PROFILE

---

### Computer Task Group (CTG)

#### 1. Key SI Contacts

Computer Task Group, Inc.  
800 Delaware Ave.  
Buffalo, NY 14209  
(716) 882-8000  
Mr. Jack Courtney, President and COO

Computer Task Group  
Industrial Systems Integration  
1995 West NASA Blvd.  
Melbourne, Florida 32902  
(407) 725-1300  
Mr. Vince Lamb, Sr. VP

#### 2. Description of Principal Business

Computer Task Group, Inc. (CTG), founded in 1966, is one of the largest providers of computer-related consulting, systems integration, and professional services to the commercial market in the U.S. Services available through CTG include consulting, systems analysis and design, programming, software conversion, education and training, systems operations, information engineering, imaging technology, networking systems integration, and industrial systems integration.

CTG makes extensive use of software automation in its professional services contracts. The scope of professional services work performed by CTG ranges from specific, minor tasks of short duration to large, complex tasks that require larger numbers of systems engineers for extended periods. Typically, CTG's professional staff augments and becomes part of the client's on-site software development team on a specific application or project. However, in recent years CTG has established approximately 20 Software Development Centers located in branches to support off-site development and implementation in support of client projects.

In 1991, CTG reported revenue of \$285 million, an increase from the \$244 million reported for 1990. This follows an increase from the \$233 million reported in 1989. Of even greater interest is the change in what CTG considers systems integration revenue from its 1990 SEC 10K filing to its 1991 SEC 10K filing. The network component of SI was taken out of reported SI revenue in CTG's 1991 SEC 10K. The 1991 SI

revenue is now restated as \$44 million—a 10% growth—rather than \$32.3 million, which appeared to be a decrease when compared with the 1990 10K estimate of \$40 million. (When restated for the 1991 10K, the 1990 estimate was reduced to \$24.3 million.)

Revenue from IBM, which was about 5% of total revenue prior to IBM taking equity in CTG, grew from \$42 million in 1990 (over 17% of CTG's total revenue) to \$72 million in 1991, (over 25% of CTG's total revenue). In 1991, IBM accounted for 29% of domestic professional services revenue, 16% of SI revenue, and 6% of international professional services revenue.

INPUT expects IBM's growing importance to CTG to impact CTG's SI efforts.

CTG's mission is to excel in service to its customers through the application of information technology. The company has developed a strategic plan for the 1990s that includes the following:

- Continuing to focus sales and marketing efforts on industries where it has proven capabilities. These include discrete manufacturing, process manufacturing, banking and finance, insurance, and state and local government.
- Capitalizing on the strength of its branch network by continuing to broaden its geographic coverage with new field offices, and developing project business and specialized capabilities within the branch operations using practice groups designed to transfer technical industry skills to the traditional branch office structure.
- Expanding alliances, particularly in the international arena: an example is CTG's strategic alliance with SAP AG of Waldorf, Germany and its American subsidiary, SAP America.
- Focusing on European operations, with a goal of growing at a level that is, at minimum, equal to the growth rate of the European marketplace.
- Continuing focus on education for CTG consultants and engineers, as well as employee retention and recruiting of professionals with special skills.

CTG has pursued expansion by opening and/or acquiring field offices to attract and support clients. In the past five years, CTG has acquired ten firms ranging in size from \$1 million to approximately \$30 million in revenue. The purchase of Scientific Systems Services for approximately

\$11 million in January 1988 was significant in boosting CTG's presence in the systems integration market. Renamed Computer Task Group Industrial Systems Integration, it specializes in integrated computer systems for manufacturing.

CTG serves both the vertical and cross-industry markets.

### 3. Company Competitive Position

CTG is one of the largest providers of professional services to the commercial market in the U.S. Its primary strategy has been to be a customer's single source for systems design and programming support, made possible by a staff of over 3,000 systems professionals.

CTG's internally developed software design and development tools enable it to compete against larger firms for SI projects. CTG is a recognized leader in the systems conversion business and has very strong abilities in the DOS-to-MVS conversion market and in client/server architecture.

CTG targets its services primarily to large manufacturing, industrial automation, financial services, and telecommunications firms with large data processing operations. CTG clients include over 71 of the Fortune 100 companies, and over 90% of the firm's new professional services contracts come from the existing client base. Over 30 of CTG's clients have billings in excess of \$1 million.

CTG will post SI revenues for 1991 in excess of \$44 million, approximately 15% of the total revenue stream. Although this amount is not in a league with those of today's major players, it represents a significant revenue stream for a company that only does commercial SI. The revenues have been generated on over 177 commercial projects, with an average size of \$450,000.

Between its 1991 and 1990 10Ks, CTG recast the way it counted SI revenue. This has made year-to-year comparisons difficult. CTG appears to be taking a very conservative approach to network integration revenue reporting. Other SI organizations are starting to include network integration revenue in total SI revenue.

### 4. Markets Served

CTG's general professional services business participates in virtually all significant vertical markets and a significant number of cross-industry markets. Exhibit CTG-I shows these markets.

## EXHIBIT CTG-1

**Markets Served**

- |                         |                                     |
|-------------------------|-------------------------------------|
| • Vertical Markets:     | • Functional areas:                 |
| - Manufacturing         | - Logistics                         |
| - Petroleum             | - Warehouse automation              |
| - Pharmaceuticals       | • Cross Industry:                   |
| - Metals production     | - Application outsourcing           |
| - Process manufacturing | - Client/server                     |
| - Health care           | - Networking                        |
|                         | - Electronic data interchange (EDI) |

CTG's focus in these areas is stimulated by its belief that these areas, in addition to being growing market segments for SI, will permit CTG to leverage its established client base.

IBM was CTG's single largest client, at \$72 million, in 1991. This was 25% of total revenue. IBM accounts for 16% of current SI revenue.

INPUT will closely observe the trend in CTG's revenue caused by the IBM account and the impact of this relationship on CTG's overall SI strategy.

**5. Recent Events of Interest**

As mentioned, CTG has been growing substantially through acquisitions. During 1990 CTG acquired Rendeck International N.V. of Amsterdam, a European provider of professional services primarily to large mainframe users in manufacturing, financial services, and banking. Rendeck was renamed Computer Task Group Europe B.V. in February 1991.

In September 1990, CTG acquired Connolly Data Systems, Inc. of Lowell, MA.

- Connolly provides integrated PC local-area network systems in the northeastern U.S.
- Connolly had approximately 45 employees at the time of the acquisition and 1989 revenue of about \$7 million.

CTG is working to unify the operations of its two acquired companies Connolly Data Systems and Telecommunications Management Consultants, both of Lowell, MA; CTG's internal Communication Services business unit; and CTG's new alliance with Novell, Inc. into an Enterprise Consulting Group.

CTG became an Alliance Partner of Novell, Inc. in 1991. It is taking part in Novell's Professional Developers Program. Under this program, CTG will provide NetWare-related consulting, integration, applications development and support services to increase the networking leader's presence in large, enterprisewide networking environments. Initially, CTG will focus on OS/2 integration with the NetWare 3.x product line.

CTG attributes some of its FY 1991 financial problems to a significant shortfall associated with a fixed-price contract of the systems integration unit, and on misjudgment of the impact of the economy in FY 1991 on both CTG and its major customers. The recession prevented the company from raising its rates.

In May 1992, CTG launched several practice groups designed to transfer technical and industrial skills to the company's traditional branch office structure. The new practices are:

- Communications System—Network-based applications, specializing in Novell LANs - Buffalo, NY
- Database Consulting—Informix, Ingres, and SQL/Server data bases and mainframe products like DB/2 - Raleigh, NC
- Image Systems Services - McLean, VA
- Industrial Systems Integration - Melbourne, FL
- Information Engineering - Buffalo, NY
- Information Media - Phoenix, AZ
- Migration Services—Transferring applications from mainframe to client/server technologies - Buffalo, NY.

## 6. SI Organization

CTG operates with a lean corporate and administrative staff of only slightly over 400 from a total staff of over 4,000 employees listed as non-professional. Headquarters provides forecasting, strategy development, and financial management, leaving much of the other administrative responsibility to local branches, which are linked to headquarters via a PC/mainframe information network. CTG currently has over 70 offices.

CTG's Institute for Technical and Management Training in Buffalo provides in-depth training for CTG staff. Thirty technical and 20 marketing and management courses are offered. In addition, employees have access to a four-week course on CTG's Systems Engineering Development Programs. INPUT estimates that 200 employees attend these classes annually. Formal training courses are also offered at selected national branch offices.

Additional SI work is done by other matrixed units of CTG, such as the Corporate Projects Office and other specialty business groups. In general, the responsibilities are divided as indicated in Exhibit CTG-2. This is quite a change from INPUT's 1989 CTG vendor profile, when only SI contract approval was centralized.

The Commercial Systems Integration Services are provided to the manufacturing and industrial markets through CTG Industrial Systems Integration (formerly Scientific Systems Services). Services provided include management consulting; concept and applications planning studies; Control-Spec™ functional specification and scope-of-work contracts; systems architecture services, including hardware selection, systems software evaluation and selection, applications software, and communications; and project implementation.

CTG currently has a full-time commercial SI staff of approximately 500. In addition, it estimates that at any given time there are at least 25 other professionals assigned to SI projects. The breakdown of staff between various skill requirements is typical of systems integration vendors whose primary business has been professional services. This is summarized in Exhibit CTG-3.



## EXHIBIT CTG-2

**Centralization/Decentralization  
of SI Business Function  
Computer Task Group**

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	N/A
Marketing and promotion	C	N/A
Account management/ sales	D	N/A
Contract review/approval	C	N/A
Project management/ control	B	N/A
Implementation/development	B	N/A
Hardware/software acquisition	C	N/A
Systems operations (if applicable)	B	N/A

C = Centralized, D = Decentralized, B = Both

## EXHIBIT CTG-3

**Distribution of SI Personnel  
Computer Task Group**

Capability	Percent
Management, strategy, planning, marketing	1
Legal/contract administration, finance	1
Project management and administration	15
Design/development/implementation	68
Hardware/software evaluation/acquisition	5
Hardware engineering	5
Sales	5

**7. SI Business Objectives**

CTG has maintained a consistent strategy of being the customer's single source for design and programming support. This strategy has led the company to the development of broader professional services capabilities, and moved CTG into the position of a "full-service" provider. As a full-service provider and rapidly emerging player in the SI marketplace, CTG has adopted two primary objectives:

- Derive revenue and increased profit margins from the special capabilities provided as a systems integrator.
- Respond to existing customer demands for buying complete solutions.

CTG recognizes that the key to increasing profit margins is through specialization. By specializing, CTG is able to command premium rates for its staff. In essence, SI is one of the several professional services specialty areas through which CTG hopes to achieve its profit objectives.

## 8. SI Capabilities Evaluation

CTG's primary strength lies in its professional services capabilities. Over 80% of its staff is college educated, and almost all of the systems engineering staff have skills in data base and communications technologies. By its own evaluation CTG ranks high in business consulting, design integration, project management, and software development. The following presents INPUT's assessment.

- Business consulting—Though not at the level of some of its competition in a broad range of industries, business consulting is a strength for CTG, particularly in manufacturing-related projects. CTG will use outside contractors and consultants to supplement its own capabilities.
- Design methodology/integration—Although CTG does not have a packaged methodology, it has made extensive use of automation to support the design and development process. This is a significant strength.
- Project management—Again, CTG has utilized technology and training of personnel to develop an effective capability. But though the approach is effective, it has not been applied to many very large projects. Given the aggressive approach to the market, this capability will undoubtedly be put to the test in the very near future.
- Software development—CTG demonstrates the state of the art in this area. Its use of advanced CASE tools and software development aids may be the best in the industry, and it appears to be making the educational and developmental efforts necessary to maintain that leadership position.
- Education, training, and documentation—CTG possesses these capabilities in house, and by INPUT's estimate is probably above average in capability. The company's use of automated software development tools should significantly contribute in the documentation area.
- Packaged applications and systems software—There are a few vertical markets in which the company has experience in this area and has begun to offer applications packages. However, INPUT believes that this is an area in which CTG could use significant strengthening. In the area of systems software, CTG has many important alliances.
- Standard computer hardware—CTG has extensive working experience with virtually all lines of IBM and DEC hardware. Other environments with which it has experience include: Honeywell, CDC Cyber, Prime, Data General, Harris and Hewlett-Packard.

- Communications hardware—As in the case of computer hardware, CTG relies primarily on alliances and partners in the area of communications. The acquisition of Connolly provided CTG with communications hardware experience to supplement its computer hardware capability.
- Service, repair, and software maintenance—CTG now provides service in this area. Although the company does provide software maintenance, this is not one of its major systems integration marketing attributes.

## 9. Strategic Alliances

CTG recognizes the need to utilize alliances to provide the total solution to the customer and to bolster its general capabilities. It utilizes both long-term agreements and contract-by-contract arrangements to accomplish these objectives. CTG's alliances tend to break down as follows:

- Technology-based alliances tend to be long term in nature. They result from the need to remain state of the art in the application of particular technology that can be utilized in many client situations.
- Solution-specific alliances tend to be formed on a contract-by-contract basis where the need of a client is unique, and there appears to be no applicability of the need to a larger target market.

The majority of CTG's alliances have been formed with hardware and systems software vendors. The primary hardware alliances are with DEC, IBM and Novell. Other vendor alliances provide capabilities in 4GLs, expert systems, and relational data base management systems.

A summary of CTG's alliances is contained in Exhibit CTG-4.

## 10. SI Capabilities Summary

Compared to other systems integration vendors, CTG has developed above-average capabilities to participate in the SI market. This is particularly true in the middle of the systems integration life cycle, overall design through implementation. As mentioned in the SI capabilities evaluation, CTG's strengths are not in front-end business consulting or follow-on maintenance activities. In most areas where there appear to be some weaknesses, CTG has developed effective alliances or is rapidly on its way to building or acquiring an internal capability to meet the need. A good example is in data communications and network management, where as recently as two years ago CTG had below-average capabilities. The acquisition of Telecommunications Management, Inc., Connolly, and the internal development of a Data Communications Group are rapidly closing that gap.

## EXHIBIT CTG-4

**Examples of CTG's Key Alliances**

Hardware	IBM Digital
Applications Software	Cortrans Lotus Texas Instruments SAP America
Network/LAN	Novell Banyan
Consulting	A.T. Kearney

Other capabilities that work in CTG's favor as a systems integration vendor include:

- The Institute for Technical Management Training
- The Corporate Projects Office, established in 1985 to address large-scale systems development

Finally, CTG's leading-edge use of technology in the design, management, and implementation of systems gives it a competitive advantage that few other integrators from the professional services market can offer.

### **11. SI Marketing Strategy**

CTG carries its philosophy of being a full-service provider into the SI marketing effort. While the company clearly does not have all the capabilities to support that position in house, it has made great strides in recent years through acquisitions and alliances to cover the approach successfully.

CTG stresses the importance of delivering a competitive advantage to its customers through the application of technology. It has focused its SI marketing efforts on selected industries and cross-industry markets (see Section 4).

A large professional services client base and a large number of geographically dispersed offices allow CTG to approach the market proactively and opportunistically. CTG can:

- Respond to needs from existing clients
- Proactively sell SI services through the large number of branches

Other facets of CTG's marketing approach are described below and summarized in Exhibit CTG-5.

- Competitors - As would be expected, CTG sees Andersen Consulting, EDS, Digital Equipment, Computer Sciences Corporation, and AMS as major competitors in the systems integration marketplace. As CTG's reputation in the market grows, it will be competing with the major players in the market.
- Positioning - To its customers, CTG presents itself as an organization that can combine management and consulting skills with proven and extensive implementation capabilities to provide state-of-the-art solutions. It points to its financial track record and portfolio of specialized skills as key assets in selling contracts.
- Promotion - CTG utilizes public seminars, client referrals, and focused trade publication advertising as key avenues to spread the word about its capabilities in systems integration. To date it has done little or no advertising in general or industry trade publications. The company finds focused trade and industrial publications to be the most valuable advertising channels.

Overall, CTG's marketing strategy has been evolving quite rapidly during the past three years. INPUT anticipates an increasing level of proactive selling in its targeted markets during the coming year, as well as an increased emphasis on SI as a tool for achieving competitive advantage through the application of technology.

## 12. SI Customer Base

CTG's target markets include large organizations in discrete and process manufacturing, financial services, insurance, and state and local government.

## EXHIBIT CTG-5

**CTG's SI Marketing Strategy**

- Opportunistic approach
    - Selling through branches
    - Use of corporate project office
  - Positioning: full-service provider
    - Selected vertical markets
    - Functional and technical specialties
  - Customer benefits
    - Competitive advantage
    - Advanced technology (systems software)
    - Reduced risk (fixed-price offerings)
  - Focused targets
    - Financial services
    - Industrial automation
    - Telecommunications
    - Systems conversions
- 
- Seventy-one of the Fortune 100 and 237 of the Fortune 500 are CTG clients.
  - Over 90% of revenue is derived from repeat business with existing clients.

CTG's client base is segmented approximately as follows:

Discrete manufacturing	32%
Process manufacturing	23%
Services	16%
Banking and finance	9%
Insurance	5%
Distribution	5%
State and local government	3%
Other	7%
Total	100%

Approximately 87% of CTG's 1991 revenue was derived from the U.S., 11% from Europe, and 2% from Canada. A three-year source of revenue summary follows:

EXHIBIT CTG-6

**Computer Task Group  
Three-Year Source of Revenue Summary**

	Fiscal Year					
	1991		1990		1989	
	Rev. (\$M)	Percent	Rev. (\$M)	Percent	Rev. (\$M)	Percent
U.S.	248	87	227.1	93	223.6	96
Europe	32.7	11	12.9	5	5.2	2
Canada	4.4	2	3.9	2	4.2	2
Total	285.1	100	243.9	100	233.0	100

CTG has 75 business units in the U.S., Belgium, Canada, Denmark, England, Germany, and the Netherlands.



As of this writing, CTG has completed over 100 SI projects. These clients are from the existing customer base and newly solicited clients, where CTG seems to be getting about 25% of its SI contracts. Some clients and projects are profiled in Exhibit CTG-7.

## EXHIBIT CTG-7

**Computer Task Group SI Project Examples**

Company	SI Project
Brigham Women's Hospital	Voice and data resource sharing
Stone & Webster	Strategic communication network
Phoenix Insurance	Client/server downsizing
Marmot	Integrated network for guest information
Volkswagen	On-line parts ordering system
Univ. of Massachusetts	Three-campus network
Bechtel/Parsons	Design engineering network
North Star Steel	Plantwide support system
Baxter Travenol	Warehouse automation
Whirlpool	Real-time distributed warehouse

One of CTG's SI projects that had a major impact on the customer was the Computer Aided Radio Dispatch System (CARDS) designed and implemented for General Electric's Major Appliance Business Group. CTG developed a paperless, computer-based zone picking operation and recommended layout changes to utilize the warehouse in an optimal manner. CTG developed the software modules for order processing, operator route assignment, operator performance standards, order verification, and preloading operations. The system utilized radio frequency technology to communicate.

The system resulted in a 70% improvement in material movement and enabled GE to reduce the number of lift trucks from 60 to 46 in a single shift. GE's products can now be shipped anywhere in the U.S. within 4 hours. When completed, this was the largest RF installation in the world. GE recovered its investment for this system within eight months.

### 13. Summary and Future Directions

Although CTG does not have the in-house capability to offer the full range of SI services, the company has formidable capabilities and is moving rapidly to cover any areas of weakness.

CTG has a superior set of in-house-developed system software tools for project management, software development, and conversions. In addition, the company's broad geographic coverage in the U.S. lessens dependence on the financial climate of a particular industry or region.

The large, well-trained systems engineering staff is a formidable asset that only the largest players—including Andersen Consulting, IBM, DEC, and EDS—can match. Though finding and developing these individuals is expensive, CTG seems to have put together a strong organization with superior qualities.

CTG's penetration of Fortune 500 firms (leading banks and financial services firms, top utilities, and telecommunications companies) indicates a solid sales capability and account control mechanism, especially for a company that is not widely known and until recently had limited SI capabilities.

Finally, CTG has recognized areas of weakness in its delivery capabilities for SI and is filling them through acquisitions and alliances.

All of these assets support the rapid expansion of CTG's SI business. The only areas of weakness appear to be in applications software, where to INPUT's knowledge CTG has few packages and a limited set of alliances.

A second area that will require some work is marketing. Market presence and image are rapidly becoming prerequisites for success in SI. Although CTG has a strong image as a contract software developer, it will need to pay more attention to making itself known as a systems integrator in the marketplace. INPUT believes that the key will be to build a track record of reference accounts that support the firm's strategy.

To be a major player, INPUT believes that CTG should move in several areas:

- CTG needs to broaden its market focus to include more SI prospects, which means acquiring more vertical-industry expertise at the consulting and applications package levels, and increasing the depth of expertise in markets already served.
- The company also will need to more actively sell SI at the branch level.

Overall, CTG is a player that is likely to be in the majors within a few short years. It is a firm to be watched. Assuming that it can afford to make some of the investments suggested above, the future looks bright for CTG.



## COMPANY PROFILE

---

Control Data  
Corporation (CDC)

### 1. Key SI Contacts

Mr. E. E. Randol  
General Manager  
Open Systems Sales  
Computer Products Group  
Control Data  
Box 0  
Minneapolis, MN 55440-4700  
Phone: 612-853-4687

### 2. Description of Principal Business

Control Data Corporation was founded in 1968. The company grew to be a leader in the production of high-performance computing systems and peripheral products. During its early growth years, CDC branched out into a variety of related and unrelated businesses, including financial and on-line educational and research systems.

Following a number of years of disappointing financial performance, the company began a process of trimming its size and refocusing resources into its core business.

The company is active in a number of markets including: mainframe, mini-, and desktop computing systems; peripheral products, and business and information services, including systems integration.

CDC has been providing systems integration services in the federal sector for the past twelve years and in the commercial sector for five.

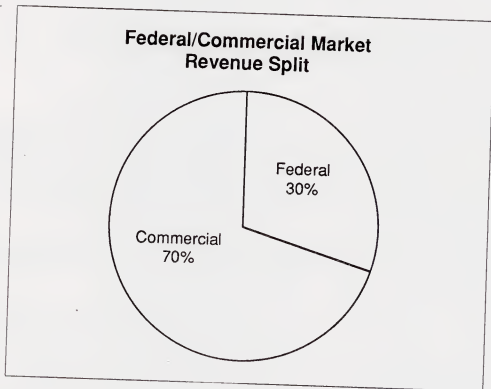
### 3. CDC Competitive Position

Between 1989 and 1990, CDC's systems integration revenues declined by approximately 19%, to \$637 million. However, during the same period, systems integration's share of total corporate revenue grew from approximately 21% to 30%, reflecting the company's increased interest in the services market.

#### 4. Market Served

Like many hardware-based companies, CDC has been active in the federal market for many years. As the commercial market began to emerge, CDC worked to leverage its federal expertise into the commercial market. As shown in Exhibit CDC-1, CDC currently derives 30% of its systems integration revenues from the federal market.

EXHIBIT CDC-1



Control Data targets primarily vertical markets, as shown in Exhibit CDC-2. Services provided to each market varies considerably.

## EXHIBIT CDC-2

**SI Vertical Market Focus**

- Marketing
- Electric utilities
- Telecommunications
- Federal government
- Business services

With the exception of the business services market, CDC focuses on services closely associated with high-performance computing. Manufacturers need high-performance computing for CAD/CAM. Electric utilities need high-performance computing for network design, analysis, and control.

Within the business services sector, CDC provides on-line data base services and financial services such as accounting and payroll.

**5. Recent Events**

In March 1991, CDC's Computer Products Division announced a \$14 million contract with the Internal Revenue Service (IRS) for 11 CYBER 932 computer systems and services. The systems will be used for high-speed printing of large volumes of data at the ten IRS Service Centers located across the United States.

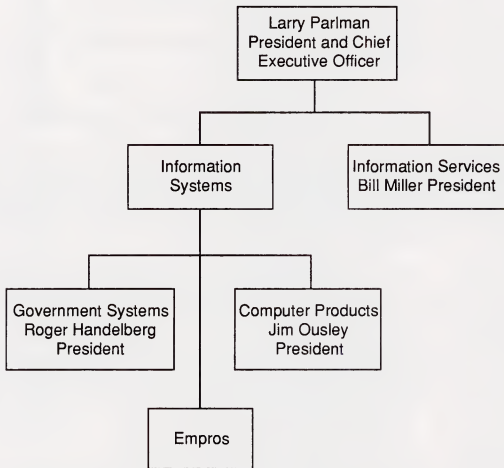
In May 1991, CDC's Government Systems Division and Computer Products Division teamed up to win a \$6.5 million contract to develop a NASA space shuttle mission modernization plan called FADS (Flight Analysis and Design System). CDC will install a distributed network, using off-the-shelf computer hardware and software, as well as providing support services to the Johnson Space Center in Houston, TX.

**6. CDC Organization**

CDC is organized into two business groups: the Information Systems Group and the Information Services Group (see Exhibit CDC-3). Within the Information Systems Group are three divisions: the Government Systems Division, Computer Products Division, and the Empros Divi-

sion. Systems integration is performed at all CDC divisions on several different levels, whether as an embedded system on a military aircraft, or a full-scale computer systems integration for a commercial business.

## EXHIBIT CDC-3

**Control Data Corporation Organization**

The Government Systems Division supplies computer systems, peripherals, software, training and related services to the U.S. Department of Defense, the National Aeronautics and Space Administration (NASA), and like agencies of U.S. allies. Although this division deals primarily with defense agencies, it is trying to broaden its scope to include some of the civilian agencies as well. The Computer Products Division provides computer systems and services to both commercial and federal clients worldwide. The Empros Division specializes in energy power systems and training simulators.



The Information Services Group works primarily on providing marketing information, business management, financial management, and network information services to the commercial sector.

## 7. SI Objectives and Revenues

Control Data's systems integration objectives reflect the trend among equipment manufacturers to place greater attention on services. The company indicates that it participates in systems integration in response to customer requirements and expects its SI business to be self supporting. Follow-on hardware and software sales are of only secondary importance.

While CDC's systems integration revenue declined between 1989 and 1990, the percentage of overall corporate revenues increased, from 21% to 30%. The company expects continued growth in both the federal and commercial sectors, with its commercial business growing at a significantly higher rate. Commercial business revenue is expected to grow at an estimated 20% per year for the next five years. During the same period, the federal business is expected to grow at only 5%.

The company reports revenues of \$600,000 for 1990. Of this, 30% is derived from federal and 70% from commercial. Seventy percent of CDC's revenues is derived by acting as a prime contractor. Twenty percent is derived from its role as a sub-contractor. An additional 10% is derived from CDC's participation in projects where the customer is the prime contractor.

The company indicates that it is currently experiencing gross profit margins of 5%-10% for systems integration services. However, like most companies in systems integration, it is experiencing an erosion of the profit margin. Like most companies, CDC realizes the greatest margins from development activities such as consulting, design, and software development.

Of CDC's commercial revenue, half is derived from its existing client base and half from new clients. Within the federal market, 70% is derived from new contracts.

## 8. Internal SI Capabilities Evaluation

The company currently has nearly 4,500 people assigned to support systems integration activities. Of the total, 3,200 are assigned full time to systems integration activities. The remainder are assigned to meet specific project or contract requirements.

Of the total personnel supporting systems integration activities, 30% are associated with systems development and 20% are associated with project management. Management and planning, administrative support, and hardware selection each represent 10% of the staff. The company reports that 17% of the staff are devoted to sales.

As with most companies, some activities are centralized and some are decentralized. Marketing, account management, and administrative functions, such as legal, are centralized. Activities that relate directly to performing customer work are decentralized. The company reports that the same basic structure applies to the federal and commercial sectors.

### 9. SI Strategic Alliances

While CDC has internal capabilities in most technical disciplines, the company does have a formal program of alliances. In the short term, CDC's alliance program is geared to provide products and services to CDC that it can then deliver as a complete solution. In the longer term, the company expects to involve its alliance partners more directly in customer contract activities.

The company has both long-term alliances and those established to meet a specific short-term need. Longer term alliances have been established to meet hardware and system software requirements. Application software needs are met through short-term alliances.

The company notes the following alliances:

- MIPS Compiler Systems
- Silicon Graphics
- Lynx
- Micro Focus
- Kuch & Associates

### 10. SI Marketing Strategy

As noted in Exhibit CDC-3, the company targets several specific vertical markets. It does not expect this to change. These markets were selected based on CDC's knowledge of the business, growth potential, and the overall competitive environment.

The company pursues a fairly traditional approach to marketing. The majority of CDC's marketing efforts are directed toward seminars, trade shows, direct mail, and client referrals. Only selected advertising is done. As with most companies, client referrals are valued highly.

Approximately 30% of CDC's federal and 50% of its commercial contracts result from client referrals. About 50% of contracts for each sector result from responses to requests for proposal. An additional 20% of commercial contracts result from proactive lead generation.

As shown in Exhibit CDC-4, CDC competes with major vendors in both the commercial and federal sectors.

EXHIBIT CDC-4

**Key SI Competitors**

<i>Commercial</i>	<i>Federal</i>
Andersen	EDS
EDS	CSC
IBM	IBM Federal

The company believes that there are a number of areas where its proprietary technology provides a competitive advantage. These include technologies related to disk array, engineering design management, archive and storage arrangement, and heterogeneous networks.

**11. SI Customer Base**

As with other companies, CDC reports there is considerable difference between the size of contracts in the commercial and federal sectors.

The value of commercial contracts range from \$6-\$8 million. Federal contracts average approximately \$100 million. For both the commercial and federal sector, equipment represents approximately 40% of the contract value, packaged software and professional services each represent about 30% of the total value.

The revenue split between centralized and decentralized systems follows the industry trend toward downsizing. Approximately 30% is for main-frame-based systems and 70% is for distributed systems.

The company provides the following examples of the type of contracts currently active.

- Canadian Government - Defense communications system
- U.S. Government - Army Corps of Engineers Automation Project
- U.S. Government - CANTASS Anti-Submarine Warfare System
- U.S. Government - AWACS Air Force Early Warning and Control System
- U.K. Government - National Electric Utility Grid Control
- Tennessee Valley Authority - Network and mail integration
- Minnesota State Lottery - Statewide automated lottery system

## 12. Summary and Future Directions

Control Data has focused on high-performance computing to develop its systems integration business. This has been productive for two reasons:

- First, it capitalizes on internal expertise and market reputation which CDC has acquired in this area as a result of its Cyber line of high-performance products.
- Second, it focuses CDC's resources into a market segment that many other integrators have not attempted to service. CDC has, therefore, enjoyed a good market share in this area.

Since SI is becoming a larger share of total corporate revenues at CDC, reflecting an increased interest in the services market, CDC will have to expand into other sectors to continue to strengthen its position in the SI market. It needs to creatively leverage its strong position in the information and business services market into systems integration engagements in order to remain a strong systems integrator. CDC, in effect, has to create a specialty integration market in this area, just as it has in high-performance computing.

## COMPANY PROFILE

---

### Coopers & Lybrand

#### 1. Key SI Contacts

Samuel Ruello  
Vice Chairman  
Coopers and Lybrand  
1251 Avenue of the Americas  
New York, NY 10020

#### 2. Description of Principal Business

Coopers & Lybrand (C&L) is a private firm of accountants and technical/engineering advisers that provides a wide range of accounting and audit, professional services, and management consulting to business, industry, and government. C&L's management consulting services unit also provides systems integration services, which are described in this profile.

C&L declined to disclose any revenue data, noting that C&L does not track SI revenues separately at this time.

#### 3. Competitive Position

C&L gains a competitive edge in the availability of highly marketable and specialized capabilities within the organization. Some of these capabilities are:

- A full systems design, development, and implementation capability using CASE and advanced project management techniques
- A wide range of technical and advisory industry skills developed through C&L's long experience as an auditing and management consulting firm
- Expertise in connectivity solutions—client/server and other distributed processing technologies
- Architecture reworking to modernize applications
- Data base expertise, especially in relational systems
- Network management skills
- Expertise in advanced technologies and applications, especially in image processing/multimedia, artificial intelligence, and object-oriented programming systems

One characteristic of any vendor growing out of an accounting/auditing firm is the conflict that arises when an auditing firm decides to compete with its clients.

#### 4. Markets Served

C&L's primary SI targets are vertical markets in which it has developed special expertise. Exhibit C&L-1 lists C&L's primary target industries.

EXHIBIT C&L-1

#### **C&L's Target Market Opportunities**

- Vertical markets only
  - Manufacturing
  - Telecommunications
  - Retail and distribution
  - Financial services, especially insurance and investment
  - Health care
  - Federal government

In addition, C&L focuses on geographically centered markets such as oil and gas in the southwestern United States and higher education in the Boston metropolitan area.

As a conservative business entity, C&L looks first for clients in areas where C&L has recognized industry expertise. Secondly, it looks for requirements with the greatest market potential.

#### 5. Recent Events

With its background as an accounting/auditing and management services consulting firm, C&L is reluctant to disclose its work for clients.

In 1989, C&L acquired Computer Assistance, Inc. of Hartford, CT. This acquisition will increase C&L's strength in the SI marketplace.

## 6. SI Organization

C&L conducts all its SI operations under the management of Samuel Ruello, Vice Chairman and head of C&L's Management Consulting Services unit. Commercial and federal SI efforts are separated, under George Van Ness and Phil Odeen, respectively. C&L's organizational structure is deeply matrixed, with geographic regions managed by partners in charge of each region. Other managers head areas of specialized industry expertise. Exhibit C&L-2 illustrates C&L's regional/industry/functional management matrix.

EXHIBIT C&L-2

**C&L's SI Management Matrix (Partial)**

Regions	Industries	Functions
Northeast	Manufacturing	Business strategy services
New York Metro	Financial services	Information technologyservices
Atlantic	Insurance	Resource and enterprise services
Midwest/Central	Health care	
Southwest	Retail and distribution	
West	Telecommunications	
	Federal	

Although separately managed, both the commercial and federal SI operations follow the same approach to management of SI businesses, as presented in Exhibit C&L-3.

## 7. SI Business Objectives

C&L's business objectives in pursuing SI work are listed in Exhibit C&L-4. It is interesting to note that C&L ranked all the objectives as primary and none as secondary.

The objectives listed above are very much in line with the pragmatic nature of C&L's background and reflect the fact that C&L does not pursue SI business as an adjunct to another business.

## EXHIBIT C&amp;L-3

### Centralization/Decentralization of SI Business Functions—C&L

Responsibilities	Commercial	Federal
Strategy, long-range planning	B	B
Marketing and promotion	C	C
Account management/sales	D	D
Contract review/approval	C	C
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	C	C

C=Centralized, D=Decentralized, B=Both

## EXHIBIT C&amp;L-4

### C&L's Stated Business Objectives

Objective	Primary/Secondary
Revenues/profits resulting from SI work	Primary
Response to customer demands	Primary
Control of account base	Primary
Strengthen C&L's non-SI business	Primary

### 8. SI Capabilities Evaluation

C&L offers a wide range of SI services that includes: business and management consulting; systems design, development, and implementation; education, training, and documentation; selection, evaluation, and acquisition of off-the-shelf and custom equipment, software, and telecommunications facilities and services; network management and operations; and software maintenance. C&L rates itself in each area as shown in Exhibit C&L-5.



## EXHIBIT C&amp;L-5

**SI Business Capabilities/Products Evaluation—C&L**

Capability	Strength	Alliance
Business consulting	High	No
Design methodology	High	No
Design/integration	High	Yes
Project management	High	Yes
Software development	High	Yes
Education/training/documentation	Medium	Yes
Packaged applications software	High	Yes
Packaged aystems software	High	Yes
Standard computer hardware	Medium	Yes
Custom computer hardware*	Medium	Yes
Communications hardware*	Low	Yes
Network management/operation	Low	Yes
Software maintenance	High	Yes

\*Capability only—no products

It is worth noting that C&L offers no equipment service and repair at this time; thus, it is not listed in Exhibit C&L-5. It should also be noted that C&L rates its in-house capability in several areas as "low," thus increasing the value of its alliances in those areas. In the critical management services/management consulting areas, however, C&L rates the values of its capabilities as high.

C&L is currently a relatively small SI services vendor. Although C&L did not offer any revenue data, INPUT estimates C&L's total SI business at less than \$50 million. INPUT expects C&L to continue to follow a conservative path toward growth in the SI business, as it would in its management consulting business. Thus, its growth will be slow but steady—based increasingly on demonstrated successful completion of SI projects.

### 9. Strategic Alliances

C&L uses strategic alliances to buttress its areas of competitive weakness. Thus, in C&L's business consulting and project management areas, C&L feels no need for cooperative partnerships. In other areas, however, C&L clearly pursues coverage that permits it to propose a total system solution (except for equipment service and repair services).

In general, C&L's strategic alliances provide:

- Complementary skills
- Computer and communications equipment
- Software packages
- New or advanced technology
- New markets, through lead sharing

Thus, through its alliances C&L gains a competitive advantage.

C&L uses both ad hoc and long-term arrangements. Arrangements with hardware and software vendors tend to be long-term and complementary; they may include lead generation, access to software, and training. Some examples of strategic alliances used by C&L are identified in Exhibit C&L-6.

EXHIBIT C&L-6

#### Limited Sample of C&L's SI Alliances

Company	Purpose of Alliance
IBM	Business partner
DEC	Business partner Electronic data interchange
Pansophic	CASE tools
Cadre	CASE tools
J.D. Edwards	Packaged software, training, demonstration
Software 2000	Packaged software, training, demonstration
Various data base vendors	Packaged software, training, demonstration
FILENET	Image processing technology
Wang	Image processing technology

## 10. SI Capabilities Summary

C&L offers a complete set of SI services capabilities, with the exception of equipment service and repair.

C&L's strategic alliances strengthen its areas of weakest capability. They are well-chosen to strengthen C&L's services offerings, increase the scope of its product offerings, and generally improve C&L's competitive advantage in the SI market place. C&L's areas of greatest weakness are in the evaluation of communications hardware and in network management and operations. In both areas, however, C&L has arranged for supporting alliances.

C&L's chosen market focus is in certain vertical industries. C&L has developed alliances with equipment vendors (IBM and DEC) to provide equipment; alliances with other (primarily software) vendors provide strength in technological areas where C&L does not have products or experience and expertise.

By focusing on selected vertical industries, C&L can now compete in its areas of greatest strength. As it gains experience, however, in other areas of the SI market, INPUT expects C&L to increase both the dollar value and the breadth of its participation in the SI market.

## 11. SI Marketing Strategy

C&L's marketing strategy is tightly focused on vertical industries in which C&L has a primary expertise (listed in section 4, Markets Served, above). C&L has developed its SI marketing emphasis as a response to the following perceived industry trends:

- A need to transfer project risk to an outside entity
- A need to increase control of systems development projects
- A need to reduce life cycle costs (and short-term costs)
- Increasing complexity of computer equipment, software, and networks

With its highly matrixed organization (described in section 6, SI Organization, above), C&L has ensured that all its selected industry markets receive the same level of service from the functional areas that support its SI operations. Also, adding additional vertical industries to its target markets will not require great changes to C&L's organization.

- Competitors - C&L competes with the vendors identified in Exhibit C&L-7.

## EXHIBIT C&amp;L-7

**C&L's SI Competition**

Commercial Market	Federal Market
Big 6 Accounting Firms	Big 6 Accounting Firms
CSC	CSC
EDS	EDS
Hardware vendors	Hardware vendors
	Software vendors

C&L has targeted vertical industries in which it can use the expertise it has developed in its professional services consulting history. It should be noted that others of the Big 6 claim to have similar expertise in some of the same industries.

- **Positioning** - C&L positions itself as a full-service firm. To its clients, C&L wants to provide all SI services, including facilities management. It is worth noting that C&L is a professional services firm with strong management consulting capabilities, and not a producer of computer equipment or software. With its alliances, however, C&L can provide all the services it chooses to propose.
- **Promotion** - C&L uses all normal forms of promotion, including telemarketing, other than television advertising and advertising in general business publications. C&L finds word-of-mouth referrals and telemarketing most effective. In both commercial and federal SI marketing efforts, C&L gains more than half its new business from its existing customer base. About one-third of its new business is gained from a combination of telemarketing and leads from its alliance partnerships.

**12. SI Customer Base**

Consistent with its background as a conservative accounting/auditing firm, C&L declined to provide any data on SI revenues or project history. It is worth noting, however, that in the vertical markets that C&L pursues, 70% of C&L's SI projects concern mainframe-based systems; 30% of projects concern distributed systems. Also, more than half of C&L's SI contract value derives from professional services; 15% derives from equipment, and 25% derives from packaged software.

### 13. Summary and Future Directions

C&L's greatest strengths lie in its management analysis capability and in its great expertise in its target vertical markets. If it selects its target projects carefully, C&L should easily succeed in the SI market. C&L's areas of greatest strength are in the management consulting and analysis areas. C&L has developed strategic alliances with producers of a wide range of computer equipment and software that permit C&L to act as a single-source SI services vendor.

C&L's self-described current weakness in the areas of custom computer hardware, communications hardware, and network management/operations are all easily overcome by carefully choosing a complementary alliance partner. Thus, INPUT expects that C&L will more effectively compete in the SI market than its own conservative ratings would suggest.



## COMPANY PROFILE

---

### Digital Equipment Corporation (DEC)

#### 1. Key SI Contacts

Russ Gullotti  
Vice President  
Corporate Services  
Digital Equipment Corporation  
Nine Executive Park Drive  
Merrimack, NH 03054-0430

#### 2. Description of Principal Business

The Digital Equipment Corporation (DEC) is the best known minicomputer manufacturer in the U.S., offering a wide range of equipment and software, ranging from small microcomputers suitable for laboratory data collection and analysis, to larger midsize machines and mainframes often used to support departmental information systems along with office automation capabilities, including electronic mail.

Also, DEC provides the following services:

- Computer services (facilities management, disaster recovery, and hardware rentals)
- Professional services (network planning and implementation, site planning, education, training, and systems integration)
- Financial services (principally leasing)
- Systems integration (program management, custom hardware and software, and third-party hardware and software)
- Product services (both DEC and non-DEC)

Based on total 1989 revenues (\$13 billion), DEC is the second-largest computer vendor in that industry.

Without question, DEC holds the leadership position in midrange systems. Over the past five years it has capitalized on its strengths in departmental and distributed computing, enabling it to expand beyond its traditional emphasis on scientific and technical computing to include the general office and administrative applications. Over the past few years, DEC has shifted its focus from satisfying minicomputer-based departmental information requirements to providing mainframe-based enterprise information capabilities.

Although DEC operates in virtually all industry sectors, primary industry markets for DEC include telecommunications, education, federal government, aerospace, automobile manufacturing, banking and finance, health care, and process manufacturing.

In 1989, DEC was a \$13 billion business overall. INPUT conservatively estimates DEC's overall 1989 U.S. SI business at about \$333 million. INPUT's analysis suggests that a figure closer to \$1 billion may well represent DEC's Enterprise Integration Services group's worldwide revenues, which include revenues from non-U.S. operations and from professional services not included in INPUT's current definition of SI services.

INPUT believes it to be accurate to divide DEC's business revenues between commercial and federal business at roughly 84% and 16%. Thus, INPUT estimates that DEC's commercial and federal SI revenues for 1989 were approximately \$230 million and \$45 million, respectively, as shown in Exhibit DEC-1.

EXHIBIT DEC-1

**DEC Systems Integration  
Revenues, 1989**

Business Component	\$ Millions
Federal	45
Commercial	230

### 3. Competitive Position

DEC, as a major minicomputer vendor, has been offering a systems-oriented (hardware and software) solution to its customers for many years. This sales position, coupled with its internal and custom software development activities, made the move into large-scale SI efforts a natural undertaking. DEC is aggressively pursuing SI business in the hundreds of thousands to multimillion-dollar range and sees as its competitors IBM, Andersen Consulting, and EDS. It competes with these vendors in both its federal and commercial business pursuits.

In addition to DEC's general financial health, DEC's primary competitive advantage is its integrated computer architecture, which permits modular systems expansion and software compatibility across hardware/software platforms. In addition, DEC benefits from an extensive library



of third-party and in-house-developed applications software and the growing use of its equipment in general-purpose departmental environments. Additional advantages include:

- An integrated office automation offering, All-In-One
- Sound fiscal management and an enthusiastic user community.

DEC continues to seek an increasing presence in the worldwide SI market; it accomplishes this by increasing the number of its target industries and increasing the scope of its strategic alliances.

#### 4. Markets Served

DEC markets its products and services to worldwide vertical industry markets; however, Digital has chosen to focus its Enterprise Integration Services efforts in the following vertical markets:

- Process industries
- Discrete manufacturing and engineering
- Finance and services industries
- Telecommunications and networking
- Federal agency requirements

The primary motivation for participating in these markets is existing customer demand. INPUT expects that the range of industries serviced will grow as DEC sees opportunity or loss of account control in any particular industry. In addition to the markets cited by DEC, it appears that DEC will continue to take a strong position in engineering and scientific, artificial intelligence/expert systems, and office automation cross-industry sectors for both SI and non-SI opportunities. Exhibit DEC-2 summarizes DEC's primary SI market opportunities.

EXHIBIT DEC-2

#### DEC SI Target Market Opportunities

Vertical	Cross-Industry
Finance & Services	Office Automation
Process Manufacturing	Artificial Intelligence
Discrete Manufacturing	Engineering and Scientific
Federal and State Governments	
Telecommunications	

As a manufacturer itself, DEC brings to its manufacturing-oriented systems integration efforts experience and understanding that are very difficult for a purely professional services contractor to obtain.

## 5. Recent Events

In early 1989, DEC formed the Enterprise Integration Services (EIS) Group, bringing together 18,000 employees who had been doing SI work and putting them into a single organization under a corporate vice president, EIS Group VP, Russ Gullotti.

In 1990, DEC EIS established its Digital Service Alliance (DSA) Program. Under the DSA Program, DEC enters into strategic alliances with other vendors whose capabilities complement DEC EIS' with respect to various potential clients' SI requirements. In addition:

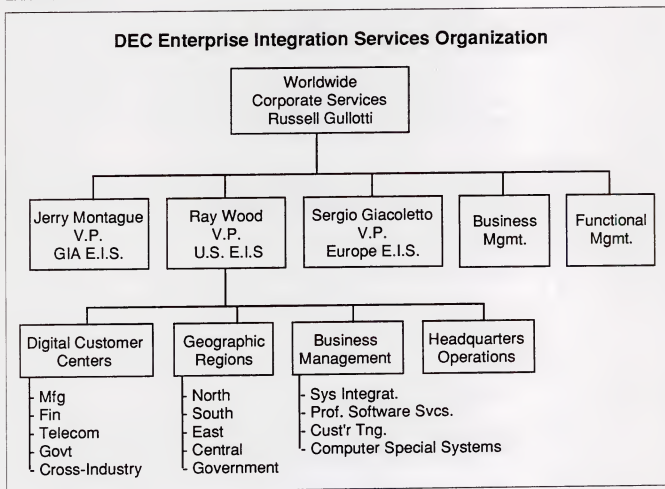
- In January, 1988, DEC and Apple declared a joint venture that has subsequently provided a solid architecture linking their respective products.
- Over the past few years, DEC has invested significant amounts in hiring experienced consultants and professional services personnel from the Big 8 and other professional services companies whose primary business has been in the "solution" selling and delivery businesses.
- In March, 1989, DEC won one of its largest SI contracts for automation of a Boeing sheet metal fabrication facility.
- Over the last year, DEC established a set of alliances with companies that have manufacturing consulting capabilities. Included among these are Deloitte Touche, A.D. Little, Andersen Consulting, Ernst & Young, and Price Waterhouse.
- In 1989, DEC won the network management component of the Kodak outsourcing contract. DEC is clearly a leader in network integration and management; this contract was a major event in the 1989 information services market.
- In 1990, DEC won a major CIM contract to rebuild the production and business planning systems for Nissan's Smyrna, Tennessee truck plant. DEC also won multimillion dollar SI contracts at BIMCO, Deutsche Telepost, Canada Post, Bankers' Trust, and Tyson Foods.
- In November, 1990, DEC EIS formed a new Consulting Services Business unit as a direct response to the demand for high-level consulting coming from DEC customers and as a key component in DEC's effort to enhance the business partnership with its customers.

- In November, 1990, DEC announced that it was proceeding with a \$60 million SI effort for an unnamed petrochemical process manufacturer in England.
- In December 1990, DEC announced that Russ Gullotti would manage a combined services organization consisting of both Customer Services and EIS organizations.

## 6. SI Organization

DEC has traditionally operated using a matrix organization; the EIS group is no exception. Exhibit DEC-3 illustrates the DEC EIS organization.

EXHIBIT DEC-3



- The Digital Customer Centers (DCCs) provide a full range of support services to the field sales organization. These centers are industry focused and include:
  - Application Centers for Technology (ACTs), which provide focused industry applications and emerging technology support expertise
  - Management consulting capability
  - Systems integration resources
- The geographic regions are responsible for managing EIS support to the geographically dispersed product sales organization.
- Business Management focuses on service or product excellence. For example, the SI Business Manager is responsible for methods, tools, and training for SI resources.

DEC has strong ties to the manufacturing industries—particularly automotive, aerospace, and process. It has historically sold at the department level in engineering and on the plant floor. Because this is such an important part of its business, DEC has established three DCCs for manufacturing. They are:

- Detroit, Michigan—focus on automotive applications
- Santa Clara, California—focus on aerospace
- Atlanta, Georgia—focus on process manufacturing

Other DCCs within the United States are:

- Washington, D.C.—focus on government systems
- Landover, Maryland—focus on telecommunications and marketing, and cross-industry applications
- New York City—focus on finance and service industries

## 7. SI Business Objectives

Russ Gullotti, DEC's Vice President in charge of all DEC's Corporate Services, including the Enterprise Integration Services (EIS) Group, announced in November, 1990, that DEC's objective in the SI market place is to become the "#1 world class systems integrator," that is, to be the leading systems and support integrator, encompassing the full range of business needs in an integrated, multivendor, enterprisewide environment.

As a result of this announcement, DEC clearly continues the shift in its approach to meeting its customers' needs from hardware and software solutions, to enterprisewide systems and services solutions. Likewise, for the DEC EIS, SI services are no longer an adjunct to the sales and maintenance of computer equipment and software. SI services have become the primary focus of the organization.

Against an SI industrywide growth forecast of not more than 20% per year, DEC EIS is planning on 25% growth.

### 8. SI Capabilities

DEC offers the full range of SI services. Consulting, design/integration, project management, hardware, communications products, systems software, etc. In particular, DEC has a wide range of specific telecommunications-oriented SI capabilities. Its strong financial position and growing capability to understand the risk management associated with SI make it a credible competitor. INPUT evaluates DEC as follows:

- **Business Consulting**—At one time a weak area, DEC is investing significantly to increase its capabilities in this field. Its Enterprise Planning & Design Services are focused on enterprise planning and the identification of strategic opportunities. Partners and alliances are used in this area, but DEC continues a campaign to acquire this skill by hiring or allying with experienced practitioners to operate in both a marketing and a consulting capacity.
- **Design Integration**—DEC has established a reputation for being able to integrate its offerings with those of other computer hardware and communications equipment manufacturers. This is one of DEC's real strengths. In addition, the unified nature of DEC's own product architecture is an advantage. Integration at the network level is DEC's major strength.
- **Project Management**—INPUT believes that DEC has demonstrated strong skills in the project management area. DEC has also invested heavily in developing a program management approach that should strengthen its capabilities in this area for jobs like the Boeing project.
- **Software Development**—DEC has extensive (perhaps the most) experience in developing applications software for minicomputers. Even though in-house expertise might be limited in some vertical markets, DEC's strong network of alliances and third-party developers has produced a full range of applications for DEC platforms.
- **Education, Training, and Documentation**—DEC has a highly developed system for education and training, and is probably better than most at being able to deliver this service flexibly.

- **Packaged Applications Software**—There are hundreds of third-party suppliers that develop software for the DEC environment. INPUT believes that DEC has strengthened its ability to create continued interest in developing packages for its platforms.
- **Standard Computer Hardware**—DEC's integrated VAX/VMS architecture and workstation line give DEC a complete offering in the on-line applications systems market.
- **Communications Hardware**—DEC's line of communications equipment is targeted primarily at DEC proprietary environments. DEC, however, provides communications systems software that permit DEC systems to communicate effectively with almost all standard network environments.
- **Network Management and Operations**—DEC is a leader in managing worldwide networks and providing network management software. Although DEC has, in the past, dealt mostly with homogeneous DEC networks, INPUT believes that DEC's commitment to communications standards and its increasing presence in the SI market will force DEC to deal more often with heterogeneous communications networks.
- **Service and Repair, Software Maintenance**—This is another of DEC's strengths. Through its Vendor Equipment Services offering, DEC is servicing heterogeneous environments for 14,000 products and applications representing over 800 vendors.

## 9. SI Strategic Alliances

DEC EIS has entered into strategic alliances with other SI services vendors whose capabilities complement DEC EIS'; these alliance agreements also allow DEC EIS to respond to clients' solicitations much more rapidly, eliminating the normal search time for matching skills and availability. Current strategic alliances are listed in Exhibit DEC-4.

DEC uses alliances in virtually all aspects of its SI business. Key alliances are performed within the Service Alliance Program and are negotiated on a supplier-by-supplier basis. In DEC's own words, the program is presented to the customer environment as follows: "Building the best solution for a customer's enterprisewide project requires many components. Creating and delivering that solution may require the use of third parties."

The program provides for formal relationships with leading service suppliers in selected technologies, industries, and application areas and it enhances the breadth, depth, and capacity of DEC total solution services. It conveys to customers that DEC can be the single source for their companywide service needs.

INPUT notes that DEC also has hundreds of alliances for applications software and other services.

## EXHIBIT DEC-4

**DEC**  
**Limited Sample of SI Alliances**

Alliance	Purpose
Andersen Consulting	Distribution and Logistics industries
Apple	Computer-integrated manufacturing (CIM)
CACI, Inc.	CIM
CSC	CIM; Distribution and Logistics industries telecommunications
Deloitte and Touche	CIM; Discrete Manufacturing; Process Manufacturing
Ernst & Young	Health Care
A.D. Little	CIM; Chemical; Pharmaceutical industries
Morrison-Knudsen Engineering	Computer Integrated Manufacturing
Price Waterhouse	F&A; Process Industries; EDI
SHL Systemhouse	CIM

Other alliances may be formed on a project-by-project basis.

### 10. SI Capabilities Summary

DEC has a full array of capabilities to compete in the SI marketplace.

Major strengths are the breadth and depth of DEC's alliances and increased customer orientation. INPUT believes that DEC has shown itself to be capable of managing very large projects and of managing risk.

A former DEC weakness was a perceived lack of vertical industry expertise outside the scientific/technical areas. However, DEC's many alliances with partners that provide the needed expertise in other industries, combined with DEC's focused Digital Customer Centers, are overcoming this weakness.



Exhibit DEC-5 summarizes INPUT's current assessment of DEC's SI capabilities.

## EXHIBIT DEC-5

**INPUT's Evaluation of DEC's SI Capabilities**

Strengths	Weaknesses
Integrated VAX/workstation architecture Selection, acquisition, and maintenance of third-party equipment In-house technical expertise Geographic coverage Depth/breadth of alliances	Perceived lack of ability in non-targeted vertical industries

**11. SI Marketing Strategy**

DEC has increasingly broadened its SI services marketing strategy to include larger and larger projects in its worldwide markets. DEC now sees itself as potentially the leader in the worldwide SI market; DEC intends to achieve that position through growth resulting from performance. As a systems integration services vendor, DEC can propose combinations of DEC and other manufacturers' equipment and software in whatever combination best meets the clients' needs.

DEC has described its strategy very simply as the following:

- Build a foundation
- Target the market
- Develop service alliances
- Deliver globally

DEC has built its foundation: the DEC EIS organization. DEC has targeted its desired market: all vertical industries worldwide. DEC has developed a wide range of alliances with complementary services vendors that permit DEC to propose all required SI services. DEC now expects to grow through its performance in the worldwide SI market.

- Competitors. In prior years DEC has declined to identify its competition as a matter of policy. This year, however, DEC identified IBM, Andersen Consulting, and EDS as its major competitors in both the



commercial and federal SI markets. It should be noted that DEC, as other SI services vendors, will compete with another vendor and then later join in an alliance with that vendor for a different project.

- **Positioning.** DEC has positioned itself as the leading worldwide provider of network computer systems by offering a full range of computing solutions for integrating the entire enterprise from the desktop to the data center. It leverages its use of alliances much more effectively than many of its competitors.
- **Promotion.** DEC utilizes all forms of promotion with the exception of direct mail and television advertising in the marketing of systems integration services. Clearly, the company feels that the most effective promotional device is the referral. DEC uses its internal worldwide network of more than 15,000 nodes and 70,000 terminals to validate its experience in networking. Other references include computer-integrated manufacturing (CIM) applications; on-line library data base networks; banking and insurance distributed processing systems; and large-scale health care systems integration projects.

DEC also maintains a responsive consultants' liaison department to positively influence independent consultants hired by companies to recommend project bidders.

DEC EIS is now pursuing a growing range of SI opportunities that can be satisfied by any combination of equipment, software, and services that it can provide. Currently, in both the commercial and federal markets, DEC EIS derives the distribution of revenue from its SI contracts presented in Exhibit DEC-6.

DEC-6

**Distribution of SI Revenue by  
Class of Service/Product**

Class of Service/Product	Percent
DEC hardware & software products	45
Third-party products and services	15
Digital services	40

In addition, DEC strategy is now to provide a complete solution within a vertical industry, rather than trying to compete for small pieces of many requirements. To this end, its strategic alliances form partnerships with services vendors who can help DEC provide complete solutions.

## 12. SI Customer Base

INPUT estimates that DEC has undertaken more than 800 SI projects over the past several years ranging in value from hundreds of thousands of dollars to over \$250 million, with an average between \$5 million and \$10 million.

Several SI efforts undertaken by DEC, for which the dollar values are known to INPUT, are shown in Exhibit DEC-7.

DEC-7

### Examples of DEC SI Projects

Company	Project Description	\$ Millions
Firestone	Computer Integrated Manufacturing (CIM)	21.0
HFSI	Paperless factory	10.0
Nissan	Paperless factory	8.0
Boeing	Sheet metal plant automation	52.0
BIMCO	International shipping network	100.0
Deutsche Telepost	Telecommunications Integration	100.0
Tyson Foods	Logistics	9.2

DEC's SI projects have encompassed applications ranging from computer-integrated manufacturing to inventory management and network integration.

In addition, major projects have been undertaken recently for the Canada Treasury Board and W.H. Smith (a London retailer).

## 13. Summary and Future Directions

DEC's strengths include its ability to manage projects involving distributed processing, networking, and communication across various vendors' processors. Network design and management capabilities are crucial to being a successful integrator; DEC scores high in this area.

Additional strengths include:

- Communications hardware and software products that enable DEC hardware to communicate with non-DEC computers
- Strong account presence through its worldwide service staff
- Financial strength, internal technical skills, and capability to manage larger-scale projects and their associated financial risks
- A rich portfolio of internally developed and third-party applications software product offerings

DEC has few perceived weaknesses, other than a potential lack of objectivity in approaching the hardware and software component issues of the solution.

INPUT believes that DEC will continue to move toward a fully matrixed, decentralized, organizational structure for administration, sales, and marketing of its SI activities. In addition, INPUT anticipates that DEC will continue to target large-scale, international, and publicly visible SI projects to enhance the reputation of its Enterprise Integration Services offering, and initiate more aggressive education of internal field personnel to help promote the SI strategy.

In summary, DEC's prospects in the SI marketplace look bright.



## COMPANY PROFILE

---

### Electronic Data Systems (EDS)

#### 1. Key SI Contacts:

##### Corporate Business Development

Gary J. Fernandes  
Senior Vice President

##### Manufacturing, Warehousing and Distribution Segment

Paul Chiapparone  
Senior Vice President  
Hank Johnston  
President, Manufacturing and Distribution  
Services Division

##### Federal Government Segment

G. Stuart Reeves  
Senior Vice President

##### International and Global Industries Segment

Mal Gudis  
Senior Vice President

#### 2. Description of Principal Business

Electronic Data Systems (EDS) was originally founded in 1962 by Ross Perot to provide systems operations services to insurance companies, government-funded health insurance programs, and financial institutions. Today it provides systems operations, processing services, professional services, and systems integration services to nearly all vertical industries and to the federal government. In addition, EDS may act as a fiscal agent for a client, taking full responsibility for data processing as well as other administrative duties such as paying and processing insurance claims.

EDS is among the leaders in providing systems integration to the federal government and entered the commercial systems integration market in the early 1980s, gaining experience and a substantial lead in this area.

EDS was acquired by General Motors in 1984 and is operated as a wholly owned subsidiary. EDS provides virtually all information processing services to General Motors.

#### 3. EDS Competitive Position

EDS is the largest systems operations and processing provider in the world and had worldwide 1989 revenues of \$5.47 billion and net income of \$435 million. Approximately 55% of EDS's revenues are from captive GM business and the remainder is from systems operations and other professional services for outside clients.

EDS has a strong set of information services capabilities and resources—including consulting, development, systems integration, and systems operations. Its operational data processing experience, including developing and operating large and small data centers, makes it a real “pro” in the efficient and cost-effective use of technology. Its systems operations experience with insurance companies and financial institutions provides it with applications knowledge of these industries. The assumption of all information systems responsibility for General Motors provides it with real business experience in the manufacturing, retail, distribution, and networking areas. And its alliance with GM Hughes provides it with aerospace industry knowledge.

The purchase by GM further adds to EDS's strengths. It provides huge financial resources to support bids, on the largest opportunities and the buying power of one of the nations largest corporations. This buying power will provide it with other vendors' products at the lowest possible price and will result in very competitive pricing.

#### 4. Markets Served

EDS recently restructured its organization and has organizations that focus on virtually all vertical markets. Its historical focus has primarily been the following vertical markets:

- Federal government
- State and local governments
- Banking and finance
- Insurance
- Manufacturing

While EDS's expertise is aimed primarily at vertical industries, the company has targeted two key cross-industry markets: engineering and networking—both areas where the company has gained a great deal of experience through its work at GM.

To become a major systems integrator, EDS has targeted the federal government, discrete and process manufacturing, aerospace, and retail distribution vertical markets. It is also making a major thrust at expanding this capability into the international market. (See Exhibit EDS-1). Under its new organizational structure, EDS will focus on all vertical markets.

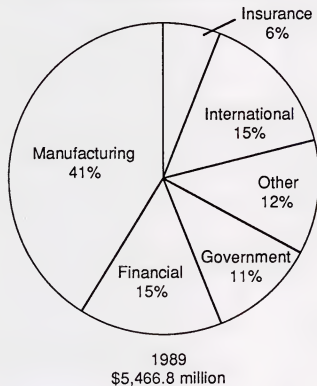
EDS's 1989 revenues, including captive GM revenues, were distributed as shown in Exhibit EDS-2.

## EXHIBIT EDS-1

**SI Vertical Market Focus—EDS**

- Federal Government
- Discrete Manufacturing
- Process Manufacturing
- Retail and Distribution
- Aerospace

## EXHIBIT EDS-2

**Revenue by Market Sector****5. Recent Events**

In November 1987, EDS entered an agreement with Tandem Computers to jointly develop and market products and services to help manufacturers connect and integrate multivendor business, engineering, and factory control systems.

During 1987 EDS began negotiations to acquire MTech and the servicing responsibilities for the third-largest ATM (automated teller machine) network in the U.S. The acquisition was completed in 1988. In 1987 EDS also acquired M&SD Corp, a supplier of telecommunications services and equipment.

In 1987 Perot sold his interests in GM-EDS and resigned from the GM Board of Directors because of fundamental differences he had with GM's management style and system. At that time Perot agreed that he would not compete with EDS for profit for a three-year period. During 1988 Ross Perot formed a new firm, Perot Systems, focused on systems integration and a direct competitor to EDS.

In March 1989, EDS entered into negotiations to purchase 20% ownership of National Advanced Systems (NAS), the other 80% to be held by the Japanese computer manufacturer, Hitachi. This investment in the company now called Hitachi, USA provides EDS with a low-cost source of computer hardware and additional leverage to gain favorable discounts from other equipment vendors.

In early 1990, EDS entered into a potential multibillion-dollar, 10-year accord with Texas Air Corporation. EDS is investing \$250 million in the airline's System One computerized reservation subsidiary for 50% ownership. Included is EDS's management of four data centers and control of 2,200 Texas Air employees.

Recent developments are summarized in Exhibit EDS-3.

#### EXHIBIT EDS-3

### Recent Major Developments

- Tandem CIM alliance
- MTech and M&SD acquisitions
- HDS minority ownership position
- Texas Air accord

## 6. EDS Organization

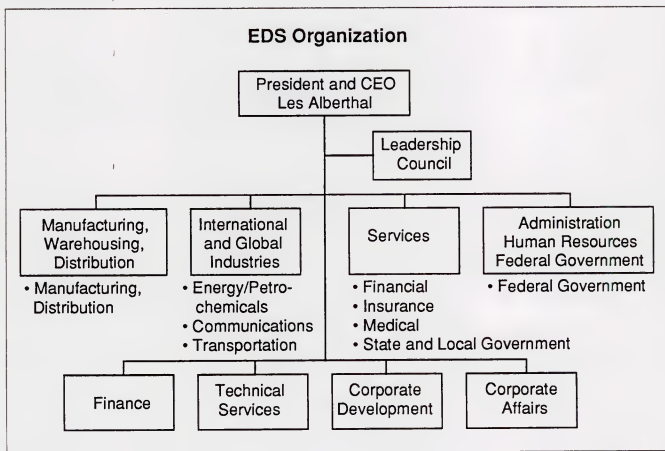
In late 1989, EDS announced major changes to its organization. Eight of its senior executives were given oversight for eight major business segments and were also assigned to the new Leadership Council. The Council has been established to provide a high-level focus on strategic planning.



The reorganization also establishes a large number of business units (well over fifty), most with divisional status, with responsibility for specific market opportunities. Most of these organizations have a specific vertical industry market focus. Similar to its major competitors, EDS has recognized the importance of building solutions for each type of customer.

Exhibit EDS-4 depicts the new EDS organization and the eight major business segments. Vertical industry market responsibilities are also identified.

EXHIBIT EDS-4



In interviews with INPUT, EDS stated that it is in the systems management business and systems integration is an essential component of that business. It also stated that most of its employees have operational experience that can be applied to SI. INPUT's estimates of EDS's 1989 SI revenues are shown in Exhibit EDS-5.

## EXHIBIT EDS-5

**EDS Systems  
Integration Revenues, 1989**

Business Component	\$ Millions
Federal	350
Commercial	150
Total	500

EDS has 60,000 employees worldwide. As mentioned above, many of these employees have skills and knowledge that can be applied to SI. INPUT has not attempted to estimate the number of personnel assigned to SI, although they are distributed among the various functional disciplines as shown in Exhibit EDS-6.

## EXHIBIT EDS-6

**Distribution of SI Personnel  
EDS**

Capability	Percent	
	Commercial	Federal
Management, strategy, planning	3	1
Legal/contract administration	1	1
Project management	10	5
System development/ implementation	75	78
Hardware/software evaluation/ acquisition	10	10
Hardware engineering	0	0
Sales	2	5

When interviewed, the EDS organizations that address most SI opportunities responded quite differently as to how they were organized to execute and manage SI contracts. This is illustrated in Exhibit EDS-7.

EXHIBIT EDS-7

### Centralization/Decentralization of SI Business Functions Electronic Data Systems

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	D
Marketing and promotion	C	D
Account management/ sales	C	D
Contract review/approval	C	D
Project management/ control	B	D
Implementation/development	B	D
Hardware/software acquisition	C	C
Systems operations	C	C

C = Centralized, D = Decentralized, B = Both

The Government Systems Group operates in a decentralized mode, with the exception of hardware and software acquisition and systems operations, which are controlled centrally. The commercial organizations have been more centrally controlled, with all activities except strategy and long-range planning, project management and control, and implementation and development controlled from Dallas. These three responsibilities were shared by Dallas and decentralized locations. INPUT believes that the major reason for the differences in these responses has been a result of the different customer requirements and the commercial organizations' proximity to EDS corporate headquarters.

As EDS's new organization unfolds, with its focus on more autonomy and delegation of decision authority, INPUT anticipates that commercial organization will become much more decentralized.

## 7. SI Objectives and Revenues

EDS's business objectives are identified in Exhibit EDS-8. Management has set a goal of reducing its dependence on GM business to 50% by 1990. It is attempting to accomplish this by holding GM-derived revenues level, while continuing to increase traditional non-GM revenues by around 30%.

EXHIBIT EDS-8

### EDS Business Objectives

- 50% of business from non-GM sources by 1990
- 80% renewal rate
- SI as a source of systems operations contracts
- Control of existing customer base
- Profitable SI business

EDS also has a business objective of maintaining a client renewal rate in excess of 80%. It is offering systems integration in response to its customers' demands, and recognizes it as a vehicle to attract new systems operations candidates and to maintain control over its existing customer base.

Finally, the company is looking to the SI business to earn a profit.

## 8. Internal SI Capabilities Evaluation

- Business Consulting—EDS has good consulting experience in the area of developing large projects. It has very good technical consulting capability based on its extensive systems operations experience. Vertical-industry business consulting capability should be particularly strong in its base businesses—process and discrete manufacturing, retail and distribution, aerospace, and networking—all areas of SI concentration. EDS' new organization should improve its knowledge of additional vertical industry markets.

- Design Methodology, Design and Integration, Project Management, Software Development, Education, Training, and Documentation—Based on the experience it has gained both in its basic systems operations business and at GM, EDS is very capable in all of these areas.
- Packaged Application Software—EDS has developed and acquired a number of vertical market packages that it uses in its traditional business. Examples are The Insurance Machine™ for the insurance industry and Flagship™ for credit unions. It is not clear what role these products may play in SI-only, non-facilities-management projects. EDS indicated in its survey response that it would prefer to use all off-the-shelf products.
- Packaged Systems Software—The company prefers to use off-the-shelf products provided by other vendors.
- Standard Computer Hardware—EDS uses standard off-the-shelf hardware provided by other computer manufacturers. EDS will most likely incorporate more Hitachi/NAS products in its bids.
- Custom Computer Hardware—EDS's commercial systems integration organization indicates that it has some custom hardware capability, but it would clearly prefer to use off-the-shelf hardware.
- Network Management and Operations—EDS has extensive experience in developing and managing GM networks and its own network that supports its processing services capability. Today it operates one of, if not the largest, networks in the world.
- Service and Repair—EDS has moderate capability in hardware service and repair.
- Software Maintenance—The company has adequate software maintenance capability.

## 9. SI Strategic Alliances

EDS has a formal alliance program that generally operates on a contract-by-contract basis. Alliances exist with computer hardware manufacturers, other GM organizations, customers, applications software providers, and non-U.S. partners. Examples of these alliances are shown in Exhibit EDS-9.

Equipment alliances have been established with leading vendors, including IBM, AT&T, Tandem, DEC, Sun, and Apple. The Tandem alliance includes a strong focus on the manufacturing industry. EDS's alliance with GM Hughes is focused on factory automation and telecommunications applications that require satellite-based products and services.

## EXHIBIT EDS-9

**EDS—Strategic Alliances**

Equipment	Digital Equipment IBM AT&T Apple Tandem Sun
Systems software	Ameritech
CIM/satellite products and services	GM Hughes Electronics
International SI	Lucky-Goldstar Telefonica
Large retail bank processing systems	Norwest Corporation Banc One Corporation
Airline reservation systems	Texas Air

Customer partnerships such as the EDS, Banc One Corporation & Norwest Corporation alliance are used to develop application offerings in areas where EDS lacks applications skills.

Software alliances, though small in number, have provided solid gains for EDS in the telecommunications market.

EDS has established a number of international alliances. In February 1987, it established a 50-50 joint venture with the Lucky-Goldstar Group, called System Technology Management (STM), to provide systems integration, data processing, and communications services to the Group's 20 affiliated firms and other Korean companies.

In September 1987, EDS Communications Corp. and Telefonica (Spain's national telephone, postal, and telecommunications organization) established a joint-venture company to develop, market, sell, and install packet data networks worldwide using Telefonica's packet-switching system.

## 10. SI Capabilities Summary

EDS has a very strong set of capabilities and few weaknesses in the SI arena (See Exhibit EDS-10). It has outstanding information systems operating knowledge in the services industries based on its experience in running data processing installations for a great number of clients in the banking, financial, and insurance industries. It has similar experience with federal and state and local government customers.

EXHIBIT EDS-10

EDS' Competitive Status	
Strengths	Weaknesses
Operational experience	Systems operations/ processing mentality
Vertical industry knowledge	Limited sales office network
Large experienced skill base	
Understands new technologies	
Alliances	

Based on more recent experience with General Motors, EDS has developed operating experience in virtually all areas of a large manufacturing company, from CIM applications to the consolidation and installation of a worldwide communications network.

These actual operating experiences make EDS uniquely qualified to develop and operate total information solutions. They also provide EDS with a very large and experienced skill base that can address a very broad range of industry applications.

EDS lacks hardware and software products (with the exception of its ownership position in Hitachi, USA), preferring to obtain other vendors' off-the-shelf products through its strong set of alliances. INPUT does not consider this a weakness because of EDS' strong financial resources and buying power.

EDS has a solid understanding of new technologies and integration techniques based on its experience in running 20 or more very large internal data centers and well over 100 customer premises data centers.

INPUT does not believe that EDS has significant weaknesses. However, its traditional systems operation focus will most likely limit its competitiveness in some systems integration opportunities. Some prospects that are committed to running their own data processing operations will be reluctant to ignore EDS's traditional motivations when an SI solution is proposed. This is justified, since it appears to INPUT that in most cases systems operations is the underlying motivation for EDS's SI activities.

EDS does not have an extensive sales office network, which may prove to be a disadvantage, as it competes with hardware manufacturers that have near-site sales personnel.

### 11. SI Marketing Strategy

Exhibit EDS-11 identifies the key elements in EDS's marketing strategy. The company promotes itself as a systems management firm. It wants to provide total service—from developing an integrated solution, through systems integration, to total systems operations—for the customer.

EXHIBIT EDS-11

#### EDS SI Marketing Strategy

- Complete service provider
- Leverage GM experience and resources
- Broad market coverage
- Build on vertical industry experience
- Reference sell

INPUT believes EDS will leverage its GM-based buying power with hardware and software vendors and partners (e.g., Hitachi, U.S.A.), as well as the vertical-industry application knowledge it has developed at GM and while operating other installations in other industries.

Finally, a key element of EDS's strategy is to use references from successful systems integration and systems operations contracts to help sell to new clients. The company will use its own data center processing centers to demonstrate its capabilities and will use satisfied customers as references.



In addition, EDS's new organization is focused on broadening its market coverage by establishing organizations responsible for solutions and growth in all vertical markets.

## 12. SI Customer Base

EDS has a broad range of systems operations customers. In many cases the first stage of these contracts requires EDS to develop a total integrated system solution. The majority of its revenue, however, comes from follow-on systems operations activities. The following table, Exhibit EDS-12, identifies representative customers where INPUT believes systems integration is an element of the total systems operation offering. Contract values are not provided, since INPUT believes that the systems operation content would make these values misleading.

EXHIBIT EDS-12

### Examples Of EDS's Customers and Contracts

Company/Industry	Project Description
Champion Sparkplug	Computer-integrated manufacturing
Caterpillar Tractor	Plant automation
Enron Corporation	Companywide systems management
State of Massachusetts	Welfare eligibility
U.S. Army - Project 80X	Personnel management
U.S. Navy - Spar	Global retail inventory and supply system
State of Florida	On-line Human Services delivery system
Bank One	Integrated large commercial banking system

### 13. Summary and Future Directions

EDS's broad range of operational experiences make it a very capable competitor in the SI arena. These strengths include:

- Vertical-industry knowledge of its traditional client base as well as GM-based discrete and process manufacturing, distribution, and aerospace experience
- Operational project development and technology transition management skills, based on actually running GM and EDS data centers and communications networks. This includes the capability to manage very large projects.
- A large, satisfied customer base
- Experience, financial resources, and product-buying leverage provided by its parent, General Motors. This insures its ability to bid very large projects at very competitive prices.
- A focus on total systems management that allows EDS to spread the initial systems integration risk over a longer time period and revenue stream

This last strength, a preoccupation with providing total systems management, may also turn out to be EDS' one major weakness. As a weakness it can:

- Lower EDS's priority on bidding on SI-only projects
- Preclude EDS from serious consideration by the SI customer that wants an integrated solution only, not a systems management contract

INPUT believes that EDS will move even more toward the total systems management concept, deriving its revenues not only from the front-end SI work, but also the follow-on systems operations contracts. The company will be extremely successful in systems management contracts, but less interested and less successful in standalone SI contracts.

## COMPANY PROFILE

---

### Grumman Data Systems

#### 1. Key Systems Integration Contact

Alfred F. Picarelli  
Senior Vice President  
Grumman Data Systems  
2411 Dulles Corner Park, Suite 500  
Herndon, VA 22071

#### 2. Description of Principal Business

Grumman Data Systems is an operating division of Grumman Corporation, which has provided systems integration services to the federal government for over 20 years. It has engaged in commercial SI projects for the past 10 years. Both groups report to management located at the Herndon, Virginia, facility, which in turn reports to the President of Grumman Corporation in Bethpage, NY.

GDS states that it has 2,000 full-time staff in its Federal SI sector and 500 full-time staff dedicated to its commercial business. While management indicates that GDS is an independent operating division, it does not indicate how many of these personnel might be located in Grumman Corporation's Bethpage facility, available for either GDS or corporate work. Other SI employees are located in facilities in Dayton, OH; Houston, TX; Huntsville, AL; San Diego, CA; Colorado Springs, CO; and Honolulu, HI.

The primary customers for Grumman have historically been the Department of Defense (DoD), the National Aeronautics and Space Administration (NASA) and other federal civil agencies. In the federal sector, the firm typically seeks contracts in the \$100 million and over category.

While GDS has made some effort to penetrate the commercial sector over the past few years, it did not specify the amount of its revenue that comes from commercial projects. The firm's management has indicated that its typical commercial contract averages between \$300,000 and \$1 million.

Grumman Corporation, like all defense contractors, announced significant personnel cutbacks in 1992. Anticipating that these cutbacks would be of a long-term nature, it announced that it would merge its aircraft group with its space and electronics group to create an aerospace and electronics group.

Yet Grumman did reasonably well in 1992, despite cutbacks in its aircraft and electronics business and losses in its reinsurance division. The firm ended 1992 with a production backlog and is expected to hold its own over the coming year.

Grumman Data Systems, owing to its roots in defense technology, offers an impressive array of capabilities in the high-end systems integration market. It offers expertise in high-speed information processing systems, distributed processing, text processing, custom software engineering, multi-level security operations, processor architecture, artificial intelligence, fault-tolerant processing, robotics, communications, and graphics. The firm is a full-service provider of logistics services, training, and systems maintenance and enjoys an excellent reputation among its customers.

Though it declines to name companies with which it has either long-term or short-term alliances, GDS acknowledges that it has both. It has clearly formed a long-term alliance with super computer manufacturer Cray Research, Inc.

Grumman announced its receipt of a NASA award in the fourth quarter of 1992. Valued at \$300 million, it may impact the resources that Grumman could apply to major commercial accounts in the immediate future.

### 3. Competitive Position

Grumman Data Systems is a formidable player in the high-end federal systems integration market, particularly when competing for a Department of Defense or NASA contract, where its track record is excellent. Though the company declines to state the percent of its current business that originates from its current customer base, INPUT estimates that the figure is extremely high.

GDS generated revenues in 1991 of \$230 million. It estimated that its 1992 revenues would be about the same, \$240 million. Given the new NASA contract for \$300 million, as well as other pending contracts, GDS should easily exceed these revenue figures in 1993 and 1994. Though GDS declined to specify profitability, they described both commercial and federal sector profitability as stable.

As illustrated in Exhibit GDS-1, in the federal sector, GDS sees Boeing Computer Services, EDS, CSC, IBM, and PRC as competitors. CDC was its primary competitor in the recently won \$300 million NASA contract.

EXHIBIT GDS-1

**Grumman Data Systems****Competitors**

Commercial	Federal
IBM	Boeing Computer Services
CSC	EDS
EDS	CSC
Lockheed	IBM
Data General	PRC

In the commercial sector, the company views IBM, CDC, EDS, Lockheed, and Data General as its primary competitors. But it is questionable whether any of those mentioned, with the exception of Lockheed or perhaps Data General, would be especially concerned about Grumman in the commercial sector for any but a limited number of specialized projects.

Grumman Data Systems is no doubt interested in the commercial sector, especially given the market projections for the next five years. However, given the continuing availability of DoD and NASA contracts, it is questionable whether GDS will have the resources (or secure the assistance that might be necessary from Grumman Corporation) to shift emphasis to the commercial marketplace.

**4. Markets Served**

As illustrated in Exhibit GDS-2, given its extensive technical background and large project management experience, Grumman Data Systems can make a strong case for itself as a potentially broad-based systems integrator. In fact, the company indicates that it has in progress, or has completed, 20 federal and 20 commercial projects, since 1990. Though the company declined to provide project revenues from either federal or commercial projects, or a breakout of the percentage that SI accounted for in those revenues, it is clear that commercial projects have yet to account for a significant part of GDS business.

## Grumman Data Systems

**Market Summary  
Based on Technical Capabilities**

Vertical Markets	Horizontal Markets
Defense	High-speed information
Aerospace	Robotics
	Text processing
	Graphics
	Distributed processing/communications

The problem faced by Grumman Data Systems in any bid for commercial business is clearly reflected in its very strengths. Its specific, vertical market expertise is clearly evident in the company's roots, the defense and aerospace sectors.

The expertise gained in those sectors has limited application in the commercial sector. Furthermore, GDS is just beginning to build the full-service capability that the commercial sector is increasingly demanding.

For example, the firm's high-speed information processing expertise, particularly in light of its preference for very large projects, has a very limited number of potential projects in the commercial sector. Commercial firms are looking for smaller, modular projects, with faster completion and, hence, faster ROI (return on investment). Also, such projects frequently involve a significant management or business consulting element which, as will be discussed later in this analysis, is currently lacking in the GDS organization.

An expertise in robotics would place them in the manufacturing sector, with a projected high growth rate in the SI marketplace. Here, however, they will come up against companies like Andersen Consulting or Digital Equipment, which have a strong vertical market track record and expertise. The fact that GDS does not even list these companies as competitors suggests that it is not bidding in this sector.

The graphics and text processing markets are extremely competitive. Furthermore, project size has been limited, as businesses have shown some reluctance to invest in this technology on a large scale. This may, however, be an area where GDS could look to the Federal civil market.

Project descriptions provided by Grumman Data Systems reflect the strengths described in this analysis:

- U.S. Air Force Materiel Command: Manage the development and installation of an on-line management information and operations system for aircraft maintenance, maintenance materials and supplies, and related support equipment
- NASA: Design, integrate and install a super computer based system to support manned space flight programs—space shuttle, space station, and advanced space exploration studies
- Suffolk County (New York State): As subcontractor, provide the systems integration capability required to automate the processing and records management of the criminal justice system
- South Carolina Research Authority: Member of team developing a system that incorporates COTS software to create modular, adaptable manufacturing environment that allows both DoD and commercial manufacturers to reduce the time needed to create parts
- Korean National Police: Modernize the command, control, and communication system of the metropolitan police, as well as oversee the development of a master plan to expand the system into the rest of the country.

## 5. Recent Events of Interest

- Grumman is part of a team awarded a \$300 million NASA contract to integrate non-mission computer operations at the Johnson Space Center in Houston.
- A joint venture between Cray Research, Inc. and Grumman was selected to enter final negotiations on a contract which would provide high-performance equipment and services to NASA's George C. Marshall Flight Center in Huntsville, Alabama, and have a total value of about \$129 million.

## 6. SI Organization

As previously referenced, Grumman Data Systems indicates it is an independent division of Grumman Corporation. It seems more likely, however, that it should be more properly described as a matrixed organization, with personnel resources provided by the Grumman organization as required.

The allocation of GDS staff, illustrated in Exhibit GDS-3, is fairly typical of SI vendors in general, with the possible exception of a 10% staff allocation to legal/contract administration. This is approximately twice the staff allocation of the typical SI vendor, but is not surprising for a vendor concentrating on the management of very large federal projects.

## EXHIBIT GDS-3

**Grumman Data Systems****Staff Allocation**

Function	Allocation (Percent)
Management, strategy, and planning	5
Legal support/contract administration	10
Project management	5
Systems development/implementation, hardware/software evaluation/acquisition, and hardware engineering	70
Sales	10

The GDS approach to SI responsibility distribution (Exhibit GDS-4) is consistent with SI vendor trends in the management of federal projects, but its commercial sector organization reflects much less decentralization than is typical of an SI vendor.

## EXHIBIT GDS-4

**Grumman Data Systems****Centralization/Decentralization of  
SI Business Functions**

Function	Commercial	Federal
Strategy/long range planning	C	C
Marketing and promotion	C	C
Account management/sales	B	C
Contract review/approval	C	C
Project management/control	B	D
Implementation/development	B	D
Hardware/software acquisition	C	B
Systems operations	B	D

C=Centralized; D=Decentralized; B=Both.



Account management and sales, project management, implementation and development, and systems operations are increasingly decentralized functions in most SI vendor operations. Vendors have found that a centralized function in these areas simply cannot respond quickly enough, or cost effectively enough, to client requirements. The GDS variance from this trend can be interpreted as reflecting its slow movement toward the commercial sector.

## 7. SI Business Objectives

Grumman Data Systems treats SI as a profit center. Management indicates that responding to customer demand is a primary motivation in SI service. They also see follow-on facilities management contracts as a primary business objective.

Surprisingly, management failed to list "account base control" as either a primary or secondary objective, which is inconsistent with a primary objective of front-end systems integration through follow-on facilities management. The response is also inconsistent, given the apparent high degree of business penetration GDS enjoys from select accounts.

Though GDS lists hardware and software sales as a highly profitable part of its business, follow-on sales in this segment was described as a secondary objective. Also described as being of secondary importance was the strengthening of the firm's non-SI business.

## 8. SI Capabilities Evaluation

As illustrated in Exhibit GDS-5, the GDS emphasis on capabilities is consistent with a high-end, technically oriented vendor. Design methodology, design/integration, project management, and software development are all highly valued and available internally. Network management/operations, service and repair, and software maintenance are also highly valued and internally available. This is consistent with the GDS primary SI marketing objective of follow-on facilities maintenance contracts.

## Grumman Data Systems

## Self-Assessed Capabilities

Capability	Exists	Value*	Alliance
Business Consulting	Y	M	Y
Design Methodology	Y	H	
Design/Integration	Y	H	
Project Management	Y	H	
Software Development	Y	H	
Education/Training/Documentation	Y	H	Y
Packaged Applications Software	N	L	Y
Standard Computer Hardware	N	L	Y
Custom Computer Hardware	N	L	Y
Communications Hardware	N	L	Y
Network Management/Operations	Y	H	
Service and Repair	Y	H	
Software Maintenance	Y	H	Y

\*H=High; M=Medium; L=Low.

Business consulting is rated at medium value by GDS management and, though available internally, is also supplemented by outside alliances. The medium importance rating is a lowered estimate from the firm's 1990 rating, when it indicated that it would be pursuing commercial business more aggressively. It is also inconsistent with the perceived value of business consulting in the commercial sector.

### 9. SI Strategic Alliances

Grumman Data Systems indicates that it has a formal alliance program, managing both short-term and long-term relationships. The firm declines to specify companies with which it has formed alliances, or the specific purpose of those alliances, beyond a general statement of designing "...the best systems integration solution."

Exhibit GDS-5 indicates the areas in which the firm has established alliances. Lower-profit items like packaged application and systems software are handled through a series of alliances, as are computer and communications hardware. Labor-intensive items like education, documentation, training, and software maintenance are highly valued resources, both available internally and supplemented with outside alliances.

Clearly, GDS has established a formal, long-term alliance with Cray Research, Inc. Jointly with Cray, GDS recently was awarded the previously referenced \$300 million NASA contract.

GDS management is clearly concerned that alliances may contaminate the firm's image. As they indicated in the survey, "...alliances, while important, can't alter our vendor-independent posture with prospective clients."

Hence, it is probably a good assumption that those areas in which the firm has no alliances are the ones it considers most important to its marketing, as well as its overall performance. The categories are consistent with a high-end technical service firm servicing government accounts.

#### 10. SI Marketing Strategy

The marketing approach emphasized by Grumman Data Systems (see Exhibit GDS-6) includes an emphasis on a high level of technical excellence, experience, and resources, e.g., systems integration skills and the ability to execute well-conceived Live Test Demonstrations (LTD's). Commitment to the principles of total quality and customer satisfaction is stressed, as is a focused opportunity identification and selection process, including the development of the right solution at the right price. The firm emphasizes an in-depth understanding of the customer and its mission and modus operandi.

---

#### EXHIBIT GDS-6

#### Grumman Data Systems

#### Marketing Strategy

- High-level technical excellence
- Well-received Live Test Demonstrations (LTD's)
- Commitment to total quality/customer satisfaction
- Development of the right solution at the right price
- Support from the Grumman Corporation
- In-depth understanding of the customer
- Management expertise: complex systems integration contracts

Support from the Grumman Corporation assures a prospect of financial stability and the resources to take full project responsibility. The assurance of management expertise gained through experience on complex system integration contracts is also convincing.

Separating the generalities from demonstrable specifics, GDS is clearly selling itself as a high-end systems integrator, offering extensive technical depth, an excellent large project management track record, and the stability gained through Grumman Corporation and necessary to assure prospects that it can reliably assume financial responsibility.

Surprisingly enough, given such a conventional and predictable marketing approach, GDS appears more committed to active promotion than one might otherwise predict. As illustrated in Exhibit GDS-7, GDS appears to be reasonably committed to an aggressive advertising program.

## EXHIBIT GDS-7

**Grumman Data Systems****Methods of Promotion**

Method	Use (Y/N)	H/M/L*
Public Seminars	Y	H
Direct Mail	Y	M
Advertising (General Business Pubs)	Y	M
Advertising (Trade or Industry Pubs)	Y	H
Advertising (Television)	N	—
Word of Mouth/Client Referrals	Y	H
Other: Trade Shows	Y	H

\*H=High activity/value; M=Medium activity/value; L=Low activity/value

As is typical of SI vendors, word of mouth and public seminar appearances rank high on the promotion list. But advertising in both general business and trade publications is also on the GDS schedule, as is active trade show participation.

Direct mail is also used, although to a lesser degree. This is not surprising, as this method presupposes a highly targeted and identifiable prospect audience, which is atypical for the SI industry, especially in the commercial sector where user/buyers may be distributed throughout target organizations.

## 11. Summary

Grumman Data Systems is a highly competent, top-end vendor, specializing in highly complex information processing projects, primarily for a select group of federal government clientele. The firm performs well and tends to maintain account control in this context.

While its avowed interest in the commercial sector is no doubt sincere, INPUT finds it unlikely that it will make serious inroads into this sector for any but highly specialized contracts in the short term.

Business consulting is a "front end" function which is frequently key to securing major commercial SI contracts. Leading commercial sector firms like Arthur Andersen view this function as critical to securing and successfully managing SI commercial projects. The fact that GDS rates this function below technical and project management functions does not bode well for its short-term chances for a significant commercial sector position.

Its recent NASA award will also keep the firm relatively busy and focused on the federal sector. Unless GDS is prepared to create a dedicated commercial sector group, it is unlikely that it will be able to expend the effort necessary to gain significant share in the commercial sector.



## COMPANY PROFILE

---

**GTE**

### 1. Key Contacts

Mr. Tom Magazzino  
President  
GTE Vantage Solutions, Inc.  
15000 Conference Center Drive  
Chantilly, VA 22021  
(703) 818-4000

GTE Government Systems Corporation  
100 First Avenue  
Waltham, MA 02254  
(617) 890-9200

Command, Control and Communications Systems Sector  
GTE Government Systems  
197 First Avenue  
Needham Heights, MA 02194  
(617) 449-2000

Mr. John Messier  
General Manager  
GTE Federal Systems Division  
15000 Conference Center Drive  
Chantilly, VA 22021  
(703) 818-4000

Mr. Doug Hill  
VP Commercial Services  
GTE Data Services Inc.  
Telecom Park  
P. O. Box 290152  
Temple Terrace, FL 33687  
(813) 978-6009

### 2. Description of Principal Business

GTE is the fourth-largest publicly owned telecommunications company in the world, with revenues and sales of \$19.6 billion. The corporation is the largest U.S.-based local telephone company and the second-largest cellular service provider in the United States. GTE is also a leader in government and defense communications systems and equipment, satellite and air-to-ground telecommunications, directories and telecommunications-based information services and systems.

GTE Government Systems Corporation (GSC), headquartered in Waltham, Massachusetts, is a pioneer in the advancement of Command, Control, Communications and Intelligence (C<sup>3</sup>I) technology, and a major supplier of customized systems for defense, government and industry in the U.S. and abroad. The corporation's C<sup>3</sup>I experience and accomplishments span close to half a century.

From its early work in radar and countermeasures in the 1950s to today's advanced communications and imagery systems, Government Systems has been on the leading edge of technology. An innovator in such areas as artificial intelligence, fiber optics and microelectronics, the corporation is also making significant contributions to digital switching, signal processing, secure voice, data communications and satellite-to-underwater communications.

GTE Corporation's merger with Contel strengthened Government Systems' technical and marketing capabilities. The merger has enlarged GSC's customer community and brings complementary skills not available before.

The integration also enhances GSC's international presence and expands its range of field services.

Now, Government Systems, with its more than 11,000 employees, is equipped to respond rapidly and effectively to a variety of business opportunities in a changing world marketplace. This includes pursuit of new customers in civil agencies and major corporations seeking telecommunications systems and management of major system developments.

GSC operates research and manufacturing units in California, Colorado, Massachusetts, North Carolina, the Washington, DC area and Rome, Italy.

The capabilities of GSC encompass a broad spectrum of technologies in addition to C<sup>3</sup>I systems. These include military switches, advanced signal processors, collection and processing systems, sensor systems, training simulators, laser and optical fiber devices and radio transceivers.

Among its services are system design, program management, operation, maintenance, education and training.

The Command, Control and Communications (C<sup>3</sup>) Systems Sector, headquartered in Needham, Massachusetts, is a leader in the design, development and production of tactical and strategic state-of-the-art C<sup>3</sup> systems for governments, military forces and commercial organizations worldwide.



The sector employs approximately 5,500 men and women of whom 1,600 are engineers and scientists, many with advanced degrees.

C<sup>3</sup> Systems Sector has wide-ranging capabilities—systems engineering and architecture, software-intensive systems design, utilization of artificial intelligence, and the total integration of information systems, hardware design, manufacturing, installation, training, logistics support, operation and maintenance.

The Federal Systems Division (FSD), formerly a part of Contel, provides and manages integrated systems solutions tailored for information processing and communications needs. More than 1,500 employees working at three major locations bring together telecommunications and data processing skills to help government and commercial customers more effectively manage vast quantities of information.

Like other divisions within GSC, the largest FSD customer is the Department of Defense. DoD relies upon AUTODIN, a secure digital message switching system network operated by FSD. It links U.S. Armed Forces installations around the globe. Designed, developed and implemented by GTE, AUTODIN is the only multilevel secure message switching system in existence. It has been in continuous operation since 1963 and handles more than 40 million messages monthly with network performance and reliability exceeding 99 percent.

GTE engineers at Federal Systems are also applying communications, networking and systems integration capabilities to create a new generation of information resource management systems that combine new and existing office equipment and technologies. These systems significantly improve productivity, enhance management control and provide easy access to time-sensitive data.

One such system is installed at the Pentagon in the Office of the Secretary of Defense. Called the Office Automation Secure Information System (OASIS), it is a secure network that links multiple types of hardware to support a full spectrum of user requirements, from basic word processing to highly technical development operations. The system operates on a high-speed fiber backbone and features document storage and retrieval using optical disk technology.

Software development is an integral part of the support provided by the division. At its Information Systems Modernization Center in Montgomery, Alabama, FSD engineers are updating software under a U.S. Air Force Command and Control System (AFC2S) software modernization contract. The modernized AFC2S will provide Air Force commanders throughout the world with up-to-date information on operations, logistics, manpower and other crucial areas.

FSD also affords GTE Government Systems an extensive client base of civilian government agencies, including the Department of Commerce, Federal Aviation Administration (FAA), U.S. Treasury Department, Justice Department, and National Aeronautics and Space Administration (NASA).

GTE Telecommunications Services Organization (TSO) was formerly part of Contel. TSO employees provide various services, from the operation of ground terminals in support of space missions to the engineering, installation, operation and maintenance of classified voice and data communications networks.

TSO employees operate NASA's space-based communications system, the Tracking and Data Relay Satellite System (TDRSS), from a ground station in White Sands, New Mexico. GTE engineers and technicians maintain virtually continuous communications between earth and numerous satellites, including the Hubble space telescope, through TDRSS. The system is NASA's primary link to low earth-orbiting satellites and is considered a national asset by the government.

The National Oceanic and Atmospheric Agency of the Department of Commerce relies upon FSD for the collection and distribution of the nation's public weather information. This includes the dissemination of National Weather Service weather watches and warnings to commercial media outlets.

Commercial, military and general aviation also depend upon a GTE system for weather information. Through a contract with the FAA, aviation weather and flight plan filing is handled by FSD at 20 Air Route Traffic Base Operations. Another FSD program with the FAA uses fault-tolerant microprocessors to catalog and format weather information for display on demand by commercial aircraft in flight.

The U.S. Customs Service of the Treasury Department employs a command, control, communications and intelligence (C<sup>3</sup>I) system developed by the division for the war on drugs. From systems located in Florida, California and Oklahoma, customs agents are able to fuse radar data, flight plans, communications, intelligence and operations support from a wide variety of sources to support international, national and local law enforcement drug interdiction efforts.

FSD is installing telephones and inmate call management systems at more than 100 federal prisons for the U.S. Justice Department Bureau of Prisons. The systems allow inmates to place direct-dial local and long-distance calls to a pre-approved list of parties and to pay for this service out of personal funds. Incarcerated individuals are able to maintain family links, so vital to rehabilitation, but with complete prison administrative control that does not compromise security.

Several agencies, including NASA, Department of Energy and DoD, lease a network of satellite earth stations that are owned by FSD. More than 150 locations are provided with full digital communications services through the system.

GTE continues to pursue large federal integration opportunities like the Army's \$1 billion Sustaining Base Information Services (SBIS) and the FBI's National Crime Information Center (NCIC 2000) upgrade.

GTE Government Systems Corporation's organization is shown in Exhibit GTE-1. GTE Vantage Solutions installations are shown in Exhibit GTE-2. The organization of GTE's Federal Systems Division is shown in Exhibit GTE-3.

GTE Vantage Solutions (GTE VS) is part of GTE Vantage, Inc., a venture capital organization in GTE Telephone Operations. It is attacking the commercial marketplace by establishing alliances with over 35 technology partners. GTE VS is providing an electronic framework for object-oriented approaches involving imaging, multimedia, workflow management, and communications. Its goal is to create a pool of core imaging technologies from which the company can assemble solutions. This is one part of GTE's new Vantage Solutions program. The other part involves recruiting regional high-end distributors and value-added resellers to become sales and support agents for the Vantage Solutions program. GTE VS is targeting opportunities in the banking, insurance, legal, and utility sectors. Secondary markets include state and local governments, manufacturing and health care.

GTE VS views itself as a cross between a value-added reseller and a venture capitalist, rather than either a vendor or an integrator. It wants to be viewed as a true solutions provider.

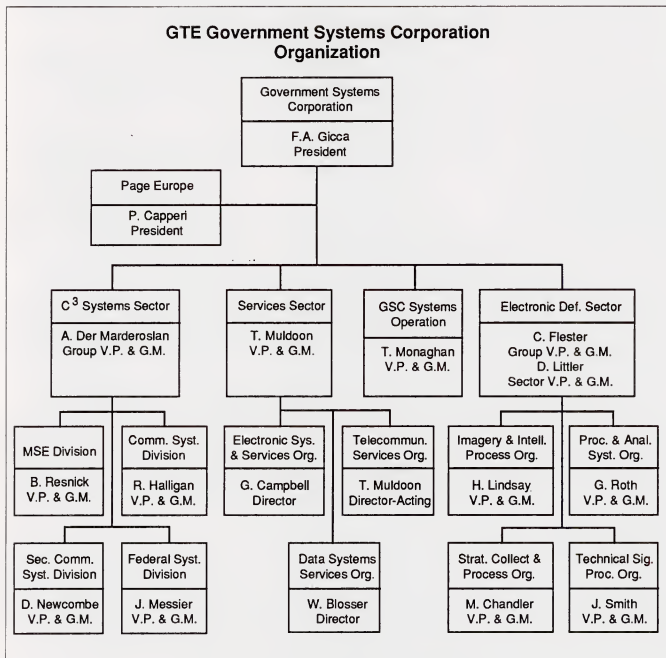
### **3. Company Competitive Position**

GTE is a worldwide leader in telecommunications, with combined revenues and sales in 1991 of \$19.6 billion and net income of \$1.6 billion. It is the largest U.S.-based local telephone company, and the second largest cellular service provider in the United States.

GTE employs 195,000 men and women worldwide. Its subsidiaries operate in 48 states and 41 countries.

GTE Government Systems is a unit of GTE Telecommunications Products and Services. Other parts of that organization are GTE Mobile Communications, GTE Information Services, GTE Spacenet and GTE Airfone.

## EXHIBIT GTE-1



## EXHIBIT GTE-2

**GTE Vantage Solutions Installations**

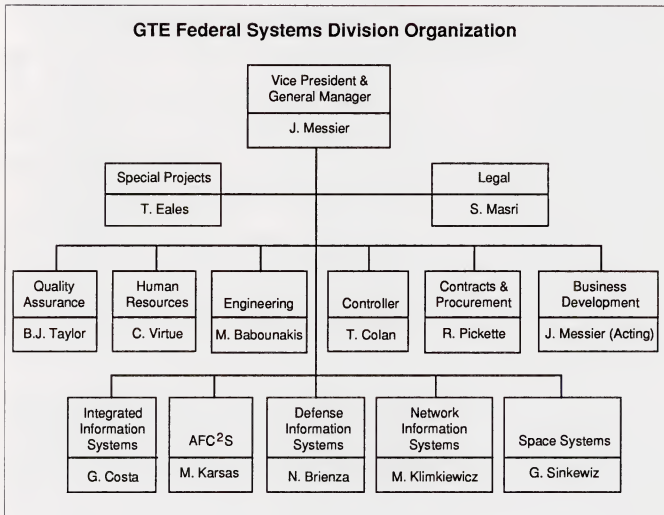
- Barnett Banks
- Indianapolis Power and Light
- Internal Revenue Service
- Mason and Hanger
- Massachusetts Bay Transit Authority
- Proficiency Testing Service
- Whitby Pharmaceutical

GTE Government Systems Corporation (GSC), headquartered in Waltham, Massachusetts, is a pioneer in the advancement of Command, Control, Communications and Intelligence (C<sup>3</sup>I) technology, and a major supplier of customized systems for defense, government and industry in the U.S. and abroad. The corporation's C<sup>3</sup>I experience and accomplishments span close to half a century.

GTE Corporation's merger with Contel strengthened Government Systems' technical and marketing capabilities. The merger has broadened GSC's customer community and brings complementary skills not available before. The merger created GTE Federal Systems from what was formerly Contel Federal Systems.

Now FSD, with its more than 1,500 employees, is better equipped to respond rapidly and effectively to a variety of business opportunities in a changing world marketplace. This includes pursuit of new customers in civil agencies and major corporations seeking telecommunications systems and management of major system developments.

## EXHIBIT GTE-3



As part of the C<sup>3</sup> Systems Sector, FSD has access to a complete spectrum of capabilities—systems engineering and architecture, software-intensive systems design, utilization of artificial intelligence, and the total integration of information systems, hardware design, manufacturing, installation, training, logistics support, operation and maintenance.

FSD is in a very competitive position for future business in the Navy umbrella communication program called “Sonata” (formerly Copernicus) and the Army program SBIS, which will start as an Army program and is expected to grow into a DoD-wide contract for services and hardware.

GTE VS is in an extremely competitive market. Being new and small may actually work to its advantage because most companies who want document management systems prefer starting out small, in just one department. Since GTE has targeted many small technology companies to be image technology partners, it is difficult to forecast just who will become partners and who will remain competitors. With each new PC or workstation chip-set improvement, image and multimedia applications become more cost effective and new solution vendors appear.

#### 4. Markets Served

It has been estimated that 65% of GTE's systems integration revenue comes from the federal government. Exhibit GTE-4 shows the markets in which GTE specializes.

EXHIBIT GTE-4

GTE Markets	
GTE VS	GTE FSD
Banking	Federal government
Insurance	Telecommunications
Utilities	

#### 5. Recent Events of Interest

GTE was awarded a \$70 million contract to develop systems to provide weather information for USAF and a \$70 million project to develop a data communications system to link 400 U.S. Air Force medical facilities.

GTE was awarded the Joint Staff Automation for the Nineties (JSAN) program, which is a \$12 million per annum program designed to increase mission effectiveness of the Joint Staff through a user friendly, integrated suite of hardware and software. The program is to run for eight years.

The program will gradually integrate the existing computers and associated peripherals of JIMS (Joint Staff Information Management System) with the new JSAN system, providing an orderly transition between the existing system and the JSAN system.

JSAN provides high-performance user workstations, integrated office automation software, and secure networking to serve a full spectrum of user requirements—from basic word processing capability to very sophisticated modeling and analysis.

JSAN is based on an open systems architecture. JSAN users can communicate among themselves, to JIMS users, and to other systems transparently. This architecture, along with salable hardware, allows users to move from a basic workstation to a high-speed processor, always working with exactly the same user interface. JSAN was awarded in November 1991 and protested by Grumman. GTE cannot proceed until this protest is resolved.

GTE has divested itself of Telos Corp. of Santa Monica, CA by selling it to C3, Herndon, VA.

GTE VS has won a \$100 million, five-year program at Barnett Bank, a \$200,000 program from the IRS, and a \$350,000 contract from the Defense Nuclear Review Board.

At the 1992 Association for Information and Image Management (AIIM) Annual Show, GTE VS introduced tools for the image processing market that can convert a variety of multimedia information, including full motion video, into a single data format. This will make the data available for simultaneous access.

## **6. SI Organization**

GTE uses both independent divisions and matrixed organizations for its SI operations.

GTE Corporation has established two organizations in Northern Virginia to pursue systems integration business. GTE Federal Systems Division was formed by GTE when GTE Government Systems consolidated with Contel into GTE Government Systems Corporation. This activity continues to target federal, state, and local systems integration opportunities.

GTE Vantage Solutions started as Contel Commercial Systems. Its name was changed to GTE Vantage Solutions as GTE exercised its control over Contel. It was created to target commercial systems integration opportunities in banking, insurance, and utilities.

Like other federal integrators, FSD still has the federal mindset and corporate culture that will hamper efforts to get into the purely commercial world.

The way that FSD assigns responsibilities is shown in Exhibit GTE-5.



## EXHIBIT GTE-5

**Responsibilities**

Task	Matrix
Responsibilities/long-range planning	D
Marketing and promotion	D
Account management/sales	D
Contract review/approval	D
Project management/control	D
Implementation/development	B
Hardware/software acquisition	D
Systems operations	B

D = Decentralized, C = Centralized, B = Both

**7. SI Business Objectives**

As mentioned elsewhere, GTE continues to pursue huge federal systems integration contracts. Winning the \$1 billion SBIS opportunity has been a major undertaking because of the size of the contract, the need for teaming partners, and the investment needed to stay in the game. Most other major federal system integrators have targeted this opportunity. The GTE team is up against teams led by IBM, EDS, and TRW.

EDS was the prime contractor for the VIABLE program, which spawned the SBIS program. EDS should be considered the incumbent, even though the Army has been running the VIABLE computer centers.

GTE Vantage Solutions' objectives are to develop alliances with specialized product and services vendors. This will allow GTE to assemble imaging, multimedia, workflow, and communication solutions out of the partnership products. The validity of this market approach for GTE Vantage Solutions has yet to be proven.

## 8. SI Capabilities Evaluation

GTE, with over \$1.6 billion in net income, has the talent and experience to address any significant SI job, especially those involving networking.

FSD must also work on developing the ability to move from its current mainframe architecture used in 58% of its SI jobs to a distributed architecture. The mainframe percentage is high because it includes data from GTE Data Services. FSD will use specialized tools in case/design methodology and GTE VS will use multimedia solutions to win new business.

## 9. Strategic Alliances

Like most federal SI vendors, GTE tends to form ad hoc alliances with companies that could be its competitors the following week. This is common practice in federal systems integration, but comes as quite a shock to commercial business people. Alliances depend on what it will take to win the deal and much depends on the integrators' sense of which hardware, software solutions, and companies the customer wants to see on the SI team. Thus, FSD develops alliances but is not bound by them.

FSD will develop alliances to add capabilities in packaged applications software, packaged systems software, and standard computer hardware where the capabilities don't exist. Alliances in software development, custom computer hardware, communications hardware and software maintenance will augment existing capabilities. A long-term agreement exists with Hewlett-Packard to provide computer hardware.

In contrast to the *ad hoc* tendencies of federal SI activities, GTE VS is establishing technology partners for its commercial imaging work. Current partners include: AEG, Amtech, BTG Products, Calera Recognition, Cirrus Technology, GeneSys Data, I-Pro, Infinite Images, JRM, KLT Telecom, Mekel Engineering, Meridian, Micro Dynamics, Personal Library Software, and Analytic Sciences.

## 10. SI Capabilities Summary

As part of the merger in 1991, Contel's Federal Systems organization was integrated into GTE Government Systems. One major segment became an operating division within the Command, Control and Communications Systems Sector. This division combined separate information management initiatives of GTE and Contel into one cohesive organization, the Federal Systems Division.

During 1991, GTE Government Systems received orders valued at \$1.2 billion, reflecting continuing opportunities in the communications portion of the defense market. GTE Government Systems ended the year with a backlog of \$2.2 billion, which includes several large orders for communications equipment under the Mobile Subscriber Equipment (MSE) contract. GTE Government Systems has been developing and producing MSE systems that enable Army personnel to communicate to and from almost anywhere in the world, under an eight-year contract awarded in 1985.

GTE Government Systems, like other members of the industry, predicts a continued decline in the Department of Defense budget for the foreseeable future based upon the recent events in the former Soviet Union and Eastern Bloc. The diminished threat to the U.S. resulting from these events, as well as the increased emphasis on domestic problems and programs will, however, provide opportunities within the civilian market, especially in the areas of communications and information processing.

Consequently, GTE has broadened its marketing strategy to seek not only a stronger presence among traditional military customers, but also to serve non-defense customers such as the Federal Aviation Administration and the Treasury Department. GTE's augmented capabilities also position it to compete vigorously for new business from the Federal Bureau of Investigation, the Internal Revenue Service and other government agencies.

Results of GTE Government Systems plans depend to a large extent on its ability to compete successfully for contracts with governmental agencies, primarily the Department of Defense. This unit faces intense and increasing competition in the U.S. for what is expected to be a shrinking U.S. defense budget. Principal U.S. competitors include: Loral, ITT, Boeing, CSC, Martin Marietta, Rockwell, TRW, Harris, E-Systems, Lockheed/Sanders, and GE/RCA. Principal foreign competitors include Thomson-CSF, Ericsson and Siemens.

In summary, GTE will continue to pursue contracts like SBIS as the prime contractor. It will also work with other federal integrators, as it did with Boeing on the RCAS project, as a subcontractor. It will look to lower cost providers for labor-intensive activities while retaining the more sophisticated work for itself.

GTE will attempt to leverage its Defense Department success into successes in the civilian federal, state, and local markets. However, INPUT expects that, like other federal SI vendors, GTE will need to maintain its installed base in the DoD because it is too difficult, in the near term, to develop customers in the commercial SI market.

GTE VS will need to leverage its existing alliances to pay back current investments. It may find that its existing solutions will not lend themselves to a modular solution, and so will be required to spend excessive time working with modifications of the original code rather than developing new opportunities.

### 11. SI Marketing Strategy

GTE GSC feels that with its background in C<sup>3</sup>I technology and as a major supplier of customized systems for defense, government, and industry, it is ready to apply its employees in rapid and effective response to business opportunities in civil agencies and major corporations seeking telecommunications systems and the management of major system developments.

FSD develops most of its federal business from existing clients. At the same time, it finds its margins for federal business declining. FSD is the prime contractor on most of its projects.

FSD uses shows like those of AFCA because they give the best return on FSD's promotional dollar. FSD has found that word of mouth/client referrals can be nearly as successful as trade shows. Direct mail and trade advertising have been less successful.

INPUT feels that GTE FSD, like other DoD systems integrators, will need to drop much of its "Cold War" DoD culture to compete effectively in the commercial market.

In its 1991 Annual Report, GTE claims that the GTE/Contel merger created the largest U.S.-based local telephone company. GTE may be spending more time with the telephone part of the merger and less time developing a coherent strategy for the systems integration part of the GTE/Contel merger.

Over the next few years, INPUT expects GTE FSD to both compete with and team with the other major federal system integrators.

Competitors are shown in Exhibit GTE-6.

GTE VS will target opportunities in document management in industries with the biggest problems: aerospace, pharmaceuticals, chemicals, insurance, financial services, legal, and government agencies. GTE VS feels that the federal market will be critical for multimedia products.

## EXHIBIT GTE-6

Competitors	
Commercial	Federal
Kodak	TRW
AT&T	Boeing
FileNet	DEC
Microtrac	IBM
CBIS	AT&T
	CSC
	Hughes ITC

## 12. SI Customer Base

GTE GSC representative customer and projects are presented in Exhibit GTE-7.

## 13. Summary and Future Directions

INPUT expects GTE to continue to pursue massive federal integration efforts. INPUT expects to see the expertise developed for DoD SI projects being applied to federal civilian SI projects rather than to commercial projects.

If GTE Vantage Solutions, Inc. is a test case for commercial systems integration, GTE may have selected an overly competitive area in which to initiate its new approach to being a systems integrator.

## EXHIBIT GTE-7

**GTE Government Systems SI Project Examples**

Company/ Organization	Project
DoD	AUTODIN
SECDEF	OASIS
USAF	AFC <sup>2</sup> S
NOAA	Weather information
FAA	Air route traffic Weather information
U.S. Customs	C <sup>3</sup> I
Bureau of Prisons	Inmate call management system
NASA	TDRSS

## COMPANY PROFILE

---

### Hughes Aircraft Company

#### 1. Key SI Contacts

Mr. C. Michael Armstrong  
Chairman & CEO  
Hughes Aircraft Company  
7200 Hughes Terrace  
Los Angeles, CA 90080-0028  
(310) 568-7200

Hughes Space and Communications Group  
P.O. Box 92919  
Los Angeles, CA 90009

Mr. Joe Kennedy  
President and CEO  
Hughes LAN Systems  
1225 Charleston Road  
Mountain View, CA 94043  
(415) 966-7300

Mr. Wayne Shelton, President and CEO  
Hughes Information Technology Company  
1768 Business Center Drive  
Reston, VA 22090  
(703) 759-1730

Dr. Ashok Kaveeshwar, President  
Hughes STX Corporation  
4400 Forbes Blvd.  
Lanham, MD 20706-4392  
(301) 794-5000

#### 2. Description of Principal Business

Hughes Aircraft Company (HAC), a subsidiary of GM Hughes Electronics, is one of the nation's largest suppliers of military and related commercial electronics, with 1991 sales of \$7.71 billion. Although its name reflects the fact that it once made aircraft, the company today is a broadly diversified industrial complex. Its many thousands of products and services encompass electronic systems, equipment, components and field services for airborne, space, ground-based, shipboard and undersea applications. Included are radio frequency, microwave, acoustic, electro-optical, fiber optic and multiplex wire communications equipment and systems; satellite communications and applications systems; military and

civil command, control and information distribution systems; computers, signal processors, data displays, control consoles, simulators and large-scale software systems; radar, sonar, infrared, television and laser sensors, reconnaissance/surveillance and electronic warfare equipment and systems; guided missiles, torpedoes and associated weapon control systems; simulation systems; and specialized components such as monolithic and hybrid microcircuits and solid-state microwave and millimeter wave components.

Like other defense contractors, HAC is looking for ways to diversify into the federal civil market and then into the commercial market. In May 1992, HAC demonstrated its technologies for a nationwide Intelligent Vehicle Highway System to IVHS America, the organization overseeing the development. Lockheed and AT&T had already announced their development partnerships.

It may be the massive federal, state, and local projects like IVHS America that best use the expertise of the defense systems integrators.

Hughes Information Technology Company (HITC) was formed as a subsidiary of Hughes Aircraft Company (HAC) to build on 30 years of federal SI and five years of commercial SI experience. HITC has entered the SI market because of its ability to manage risk and capacity, technology expertise, depth, and client relationships and, to a lesser extent, project management skills. Mr. Wayne Shelton was brought in from another well-known system integrator as President and CEO.

The mission of HITC is summarized in Exhibit HAC-1.

Early in 1992, HAC acquired ST Systems Corporation (STX) of Lanham, MD, made it a subsidiary, and renamed it Hughes STX Corporation (HSTX). This added professionals with experience in civilian and commercial earth and space science programs, transportation systems, and information management to HITC's experience with DoD and other classified programs.

HITC and HSTX now have more than 3,000 professionals to apply to SI programs. The HITC organization components are listed in Exhibit HAC-2. Most of HITC's current military and intelligence programs are classified. They cannot be discussed or even enumerated in an unclassified document such as this profile. HSTX has worked for civilian federal and commercial organizations. Information about this work is more readily accessible.



## EXHIBIT HAC-1

**Summary of HITC Mission**

- Preserve and increase Hughes' strengths in technology
- Broaden information system base
- Develop new clients in:
  - Intelligence Data Management System
  - Space Craft Command and Control Systems
  - Ground Station System
  - Federal Information Systems
  - Defense C<sup>3</sup>I Systems
  - Earth and Space Science
  - Geographic Information Systems

HITC hopes to leverage its existing contracts in network and data base integration within DoD and its air traffic control work to expand into new markets.

In 1989, HAC acquired SYTEK, a leading local-area networking company, and renamed it Hughes LAN Systems (HLS). HLS has more than 12 years of experience in designing, building, and supporting local-area and wide-area networks in enterprisewide, multivendor interoperable environments. HLS offers network design, consulting, and integration services as well as a commercial line of network products.

HLS has one of the largest installed bases of Simple Network Management Protocol (SNMP) managers in the industry, with many enterprisewide sites exceeding 50,000 nodes. HLS introduced the first SNMP manager built on a relational data base in 1989.

## EXHIBIT HAC-2

**Organizational Components**

- Hughes Information Technology Company
  - HITC Headquarters, Reston, VA
  - Washington Engineering Laboratory, Reston, VA
  - Hughes Data Information System, Sea Brook, MD
  - Detroit Engineering Laboratory, Troy, MI
  - Colorado Engineering Laboratory, Denver, CO
  - Hughes Spatial Data Systems, Denver, CO
  - Colorado Springs, CO
  - Information Systems Division, El Segundo, CA
  - Spatial Data Systems Laboratory, Calgary, Canada
- Hughes STX
  - HSTX Headquarters, Lanham, MD
- Locations
  - Atlantic City, NJ
  - Huntsville, AL
  - Boulder, CO
  - Lexington, MA
  - Greenbelt, MD
  - New York, NY
  - Hampton, VA
  - Sioux Falls, SD
  - Vienna, VA

HLS has played a leading role in standards-based network management from the beginning and has been instrumental in the development of SNMP. Hughes engineers have authored or co-authored many of the Management Information Base (MIB) standards that have been adapted by the Internet Engineering Task Force (IETF). MIBs are the object data base for information collected about a network device. HLS is now

taking the lead in specifications for Simple Management Protocol (SMP), which offers capabilities currently lacking in SNMP. This product will compete with OSI's Common Management Information Protocol (CMIP).

HLS is moving to the solution sale of integrated systems and away from the sale of components. Unlike the secrecy that surrounds HITEC, HLS has begun a national marketing tour for professionals involved with networks and information management. At marketing presentations, HLS stresses that networking has entered the integration age; standards-based, open systems have created the potential to integrate enterprise, departmental, and desktop systems into a multivendor network. HLS presents its products and systems integration skills as a way for companies to participate in this new integration age.

### 3. Company Competitive Position

As part of Hughes Aircraft and therefore part of General Motors Corp., HITEC has available an extensive reservoir of talent and experience. If the acquisition of STX is an example of Hughes' acquisition strategy, INPUT expects Hughes to acquire other organizations to further complement its current organization. HSTX was added because HITEC forecasted a trend of communications becoming a dominant part of SI projects in the near term.

As part of the same company—General Motors—EDS and HITEC could be powerful teaming partners for some major upcoming programs such as the Army's Sustaining Basis Information System (SBIS) and NASA's Earth Observing Satellite System Data and Information Systems (EOS-DIS). HITEC needs a high-profile win to establish credibility as a systems integration partner for a company outside General Motors. EOS-DIS is estimated to be a \$3 billion, 15-year project. The project will start with about 10,000 initial users.

INPUT feels that HITEC will continue to win classified federal programs and that HSTX will continue to win federal civil programs and to expand its commercial earth science products. If HITEC wins EOS-DIS, it will have a start in the federal civilian market. If GM and HAC continue their support of HITEC and they win EOS-DIS, INPUT expects them to start marketing to state and local governments.

HAC and its subsidiaries will not divulge their SI revenue. A measure of their success is shown in Exhibit HAC-3. The low growth rate for HITEC's projects and the declining margins make it imperative that it find opportunities within HSTX's civil, federal and commercial markets.

## EXHIBIT HAC-3

**AAGR and Margins**

Organization	Average Annual Growth Rate		Margins	
	Commercial	Federal	Commercial	Federal
HITC		5-6	S	D
Hughes STX	25	15	S	S

S = Stable, D = Decreasing

**4. Markets Served**

The markets served are shown in Exhibit HAC-4.

## EXHIBIT HAC-4

**Vertical Markets**

- Earth sciences
- Federal government
- Health care
- Manufacturing
- Satellites and satellite services
- State/local governments
- Telecommunications
- Transportation
- Utilities

## 5. Recent Events of Interest

In February 1992, C. Michael Armstrong, widely thought to be IBM Chairman John Aker's heir apparent, left his post as chairman of IBM World Trade after more than 30 years at IBM to become chairman and chief executive of Hughes Aircraft. Mr. Armstrong had also served on the powerful IBM Management Committee and Corporate Management Board. INPUT expects that this individual, who came from a background of IBM World Trade with a reputation for being a hard-driving marketing whiz, will show some interest in the SI and commercial endeavors of his new company.

Hughes Aircraft has stated that Mr. Armstrong's mandate is to propel commercial work at Hughes from its current 30% level to 50%, moving Hughes from being a weapons maker to being a provider of commercial services. This will have an impact on the staffing and facilities of the existing organization.

Of course, Mr. Armstrong's mandate for more commercial work must be tempered by his requirement to fight for HAC's share of the DoD budget, especially in fighter-jet radar and in missile systems. HITC's presence in "black programs" can expose it to the vagaries of the ongoing reorganization of the intelligence community.

On June 30, 1992, Mr. Armstrong announced a 15% reduction in a workforce of 60,300. This downsizing and restructuring is to continue for 18 months. This is designed to speed HAC's move towards commercial markets in a post-Cold War world.

HITC continues to get follow-on and upgrade contracts from DoD for programs such as logistic systems. Most of these programs are classified and are not easy to identify either individually or collectively.

When STX was acquired it brought to HITC an installed base in space products and in robotics, neither of which has much to do with systems integration. Recently HSTX won the rights to sell the space products from the Russian-owned ALMAZ-1 radar imaging satellite. HSTX also is marketing an articulated robot.

In June 1992, Hughes STX and ICL announced a series of security products for the PC. These commercial products are designed to bring significant information security to large PC-based corporate networks.

HLS has received a \$2.1 million contract to internetwork the nationwide operations and manufacturing facilities of GE Nuclear Energy's San Jose, CA headquarters.

Late in April 1992, Hughes Aircraft Co. reorganized its management structure into business sectors to focus attention on commercial business while making the defense units more competitive. The sectors are: Aerospace and Defense Sector, Systems Integration Sector, General Motors Programs Sector, Commercial-Industrial Sector, and Telecommunications and Space Sector.

HAC agreed to buy the missile business of General Dynamics in a transaction that would give GD at least \$450 million. This will double the size of Hughes' missile business to more than \$2 billion in annual sales, making HAC's missile business equal in size to the other large U.S. missile builder, Raytheon Corp.

In May 1992, HLS announced the first third-generation communication hub for remote site users. It also announced new Reduced Instruction Set Computing (RISC)-based Ethernet modules, based on Intel Corp.'s 1960 RISC chip, for its intelligent hubs.

HLS survived a protest at the Social Security Administration (SSA) and has started work on a \$7 million contract to install LANs at 161 SSA hearing appeals office locations and to connect these 161 locations via WANs to a single data processing center.

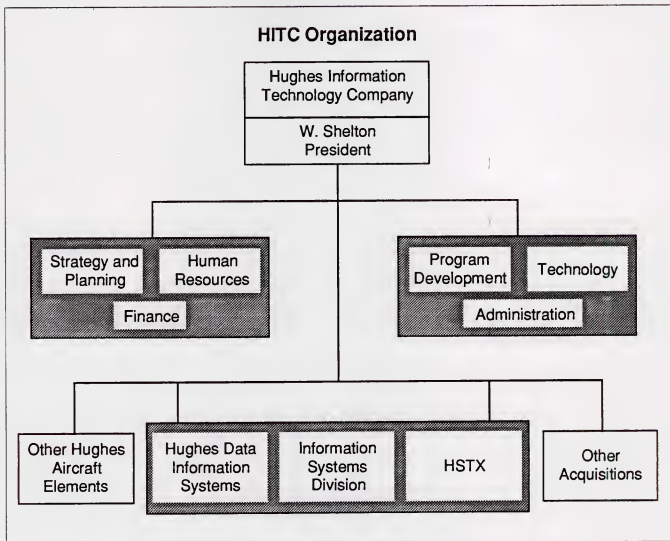
## 6. SI Organization

Hughes Aircraft established Hughes Information Technology Company in November 1990 as a systems integration subsidiary. Its task is to pursue large-scale federal government projects and to coordinate the system integration activities of Hughes. Also, it will direct a move into the commercial sector.

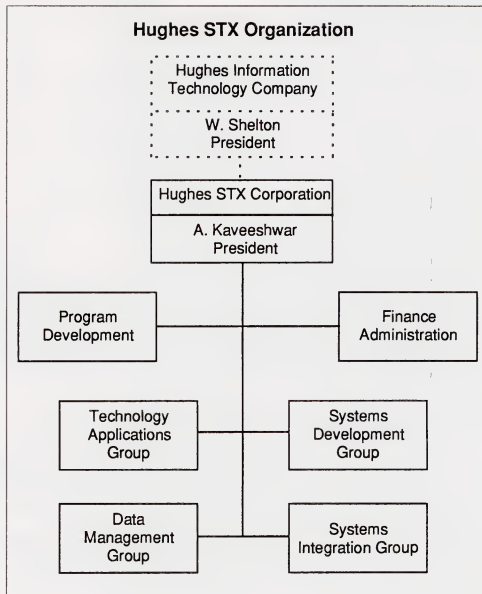
HITC is currently part of the Telecommunications and Space Sector. Organization was done this way for internal business reasons. Despite the Hughes Aircraft internal structure, HITC expects to take the business lead for systems integration. It should not go unnoticed, however, that HITC has a large sibling in EDS that is also a part of General Motors. Though EDS is more interested in outsourcing than in systems integration, outsourcing vendors are always presented with systems integration opportunities by their customers.

The HITC organizational chart is shown in Exhibit HAC-5. The Hughes STX organizational chart is shown in Exhibit HAC-6.

## EXHIBIT HAC-5



## EXHIBIT HAC-6



An example of the differences that will need to be reconciled between HITC and HSTX in the way responsibilities and activities are assigned can be seen in Exhibit HAC-7. These two organizations lacked a common approach to SI management responsibilities before they were consolidated.



EXHIBIT HAC-7

### SI Contract Responsibilities Organizational Approach

Responsibilities	HSTX	HITC
Strategy and long-range planning	C	B
Marketing and promotion	D	B
Account management/sales	NA	D
Contract review/approval	C	D
Project management/control	C	D
Implementation/development	C	D
Hardware/software acquisition	B	D
Systems operations	C	D

C = Centralized, D = Decentralized, B = Both, NA = Non-applicable

Both HITC and HSTX build on their existing client base. Thus, 63% of the total average staff at HITC and nearly all the staff at HSTX are involved with system development and implementation. Only 5% of the total average staff at HITC and about 10% of the total average staff at HSTX are involved with management, strategy, and planning. There is a noticeable difference between HITC and HSTX on the percentage of total average staff assigned to project management. HITC has about 15% assigned, while HSTX assumes that it is part of the job and lacks staff specifically assigned to project management. The HSTX statistics are skewed because HSTX supplies support services for the government, which provides its own project management.

Since HLS started as a commercial business, it has retained a commercial organization. The SI component is part of the national sales organization; the regional sales managers and the director of SI report to the VP for North American Sales.

## 7. SI Business Objectives

HITC's objectives are to transfer the technology and expertise it has developed in 30 years of systems integration to satisfying customers' requirements for state-of-the-art technology and applications. HITC will diversify in its major service areas of federal information systems, C<sup>3</sup>I, geographic information systems (GISs), and earth and space sciences.

HITC's primary reasons for being in the SI marketplace are to generate revenues and profits, control its account base, generate follow-on hardware and software sales, and to respond to customer demands.

As part of HITC, HSTX will seek opportunities to leverage its experience with civil, federal and commercial sales for more and larger contracts. One promising area for expansion is seen in the growth of the "Green Revolution." This growth is generated by concern for the earth and environment and by the related dependence on earth resources, products and services provided by satellites, ground stations and enterprisewide networks.

HLS's business objectives are to establish long-term partnerships with customers and third-party vendors and to work in partnership with other Hughes divisions to research, develop, and market products for the worldwide communications market. It performs systems integration for projects in the \$1 million to \$7 million range. For projects larger than that it will team with core systems integrators such as EDS. HLS does not produce operating systems or industry-specific application code for computer hardware.

## 8. SI Capabilities Evaluation

HITC's ability to compete in the SI market is difficult to assess. It is reluctant to discuss either the nature or the number of its classified contracts.

Systems integration is a business offering that provides a complete solution through custom selection and implementation of a variety of information system products and services. HITC has broad systems integration capabilities. Except for business consulting and packaged applications software, HITC offers all capabilities required by a company from its system integrator. HITC develops 100% of its SI projects using a distributed architecture.

Exhibit HAC-8 shows the relative margins that HITC can develop from various integration components.

## EXHIBIT HAC-8

**Relative Margins Integration Components**

Integration Component	Relative Margins
Standard hardware and software	L
Customized hardware and software	H
Software packages	L
Consulting/design/integration	M
Custom software development	H
Project management	M
Training and education	M
Post-installation operations	M

H = High, M = Medium, L = Low

HSTX can point to several programs that demonstrate unique capabilities and give it a competitive advantage. It has had extensive experience with the products of the Landsat satellite and with non-radar air traffic control systems. HSTX has developed 50% of its SI projects based on mainframe systems and 50% based on distributed systems. This reflects the centralized processing of satellite-based products.

HSTX has extensive experience with commercial information security. This has led to development of a series of shielded desktop computers. HSTX will become the secure communication arm of HITC.

HLS will continue to pursue networking SI programs in which proprietary products such as the Enterprise Hub, MONET, LINC/Term, ProLINC, and HLS's SI experience can be used to solve enterprisewide communication problems.

### 9. SI Strategic Alliances

HITC uses alliances to supplement its internal capabilities. It forms alliances on a case-by-case basis and not for the long term. HITC gains 75% of its revenue as a prime contractor and 25% as a subcontractor.

An example of an internal strategic alliance is the HITC and EDS team for NASA's proposed \$5 billion EOS-DIS.

HITC has identified several companies as alliance partners. Besides EDS, they are Loral, GE, Autometric, and PAR.

HSTX has traditionally gained 95% of its SI revenue as prime contractor and 5% from support to projects managed by its clients. Like HITC, HSTX forms its alliances on a case-by-case basis. Specific-purpose HSTX alliances are shown in Exhibit HAC-9.

EXHIBIT HAC-9

Hughes STX Alliances	
Company	Purpose
ICL	Packaged software and hardware
NPO Machinostroyeina	Earth imaging provider and service
Starsys	Satellite communications
Unitree	File system software

### 10. SI Capabilities Summary

HAC has developed its systems integration skills in a very protected environment. The company was well suited for highly classified programs because of its corporate culture. This corporate culture, combined with a DoD-wide "Cold War" mindset and ongoing efforts to consolidate HITC and HSTX, makes it difficult for the company to be open. Because of its 30 years of experience and its President and CEO, HITC would be a logical choice for some programs. Appropriate programs must be determined on a case-by-case basis.

For federal information systems, HITC offers end-to-end information systems based on its previous experience in supporting sophisticated space missions for the federal government. The capabilities offered consist of mission synthesis, mission management, spacecraft command and control, data management and communications, mission instrument data processing, operations and maintenance, and signal processing. To do this, complex organizational structures and missions will be required.

In working with some of the world's most complex real-time integrated mission management systems, HITC has had to coordinate mission activity bases for the system user, maps and interactive timeliness for the mission planner, and telemetry and control for the mission operator. Because of the complex nature of this work, HITC has developed an exceptionally advanced data base design environment.

For C<sup>3</sup>I systems, HITC offers more than 20 years of experience in the total life cycle of space ground systems, including: facility design and engineering, RF terminal signal distribution, computer/communications systems, systems integration, mission planning and control, spacecraft control, mission sensor data processing, operations and maintenance, and performance optimization.

The HITC national testbed communications network provides all communications requirements for multiple sites networked across the U.S. and enables distributed simulation of complex real-time scenarios in a realistic environment.

For geographic information systems, HITC offers expertise to federal, state, and local government agencies with a particular emphasis on developing products and service capabilities relevant to public safety, land records management, public transportation, infrastructure management, and renewable resources management.

In general, for earth and space sciences, HITC will use its heritage in these studies to focus on information technology supporting: global change scientific research, environmental monitoring, and archiving, management and distribution of earth observation data.

Like other defense-based organizations, HITC will need to modify its internal cost structure to allow it to compete outside the government marketplace.

HLS has taken a leadership position in designing, building, and supporting LANs and WANs. The company conducts network design, consulting, and integration for companies with complex and rapidly changing networks. This qualifies it as a company to select for SI projects that involve networking.

## 11. SI Marketing Strategy

HITC was established to support large-scale technology diversification and implementation within civil and defense agencies. To accomplish this, it is headquartered near Washington DC; it is focused on large-scale integration for mission-critical systems; and it has the capability of supporting the systems building process throughout the full life cycle.

The basic strategy is to combine the aerospace and communications capabilities into a basic integration company. The SI capability will be built on HITC's successes and the new companies added to round out its total capabilities. HITC will rely on proprietary technologies in software systems to give it an edge in bidding SI projects.

Unlike other defense contractors, HAC is stressing that it wants to create new markets rather than expand into existing markets. HITC plans on more multi-agency/ bureau acquisitions of hardware with shorter buying periods. HITC also plans on communications becoming a dominant requirement in the near term.

It should be noted that these statements are being made while HAC is busy buying the missile division of General Dynamics.

HLS markets with the basic philosophy of promoting the formation of partnerships with its customers, which means first understanding their unique requirements, and then providing the best network solutions from those available on the market.

HSTX's SI competitors are shown in Exhibit HAC-10.

HITC targets the functional markets of earth and space sciences, defense and civil federal information systems, and defense C<sup>3</sup>I systems. It expects to leverage its existing clients for new contracts 75% of the time. It has developed this relationship with clients because of its stress on high-quality customer service and its ability to deliver high-value technology solutions on time and within budget. This is reflected in its use of word of mouth and client referrals as the most successful methods of business promotion. Its dependency on this method can be traced back to successful classified programs that could not be discussed in any open forum.

HITC's SI competitors are shown in Exhibit HAC-11.

## EXHIBIT HAC-10

**HSTX Competitors**

Commercial	Federal
McDonald/Detwhiler (Canada)	CSC
	SAIC
	PRC
	TRW
	Lockheed
	etc.

## EXHIBIT HAC-11

**HITC Competitors**

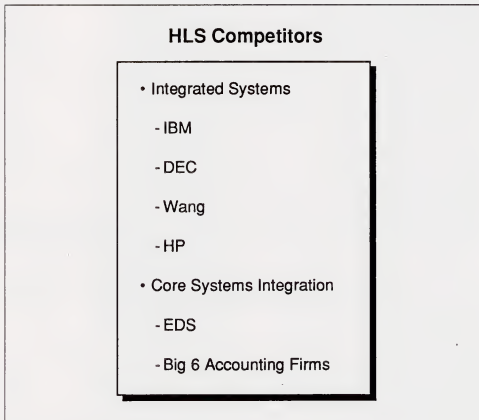
Commercial	Federal
Arthur Andersen	TRW
	GE
	GTE
	CSC
	SAIC
	PRC
	Martin Marietta
	Lockheed

The marketing strategy of HLS is to position itself as capable of installing anything from value-added solutions with a market segment focus to the lower end of core system integration. HLS estimates that this category encompasses projects between \$1 million and \$7 million. For larger core systems integration projects—\$5 million and up—HLS expects to team with companies such as EDS.

HLS will continue to serve on the standards committees for networking as part of its marketing efforts.

HLS's competitors are shown in Exhibit HAC-12.

EXHIBIT HAC-12



## 12. SI Customer Base

HITC has inherited an installed base of DoD business from HAC and an installed base of civilian federal and commercial networking, scientific, and space business from STX. The challenge is how well these customers can be leveraged into new federal and commercial business.

A representative sample of Hughes STX's customers is shown in Exhibit HAC-13.



## EXHIBIT HAC-13

**Hughes STX Customers**

Customer	Application
NASA	Science and software support services Engineering analysis Data base management
FAA	Non-radar air traffic control systems
NOAA	Software systems development Systems integration
U.S. Geological Survey	Data management Science, software support services Operations management support
NOAA (Joint Venture)	Next generation weather radar (NEXRAD)
DoD	Office automation Networking Data management Systems development and integration

**13. Summary and Future Directions**

It will be difficult for HITC to compete in the federal and commercial SI business with the presence of a large sister organization—EDS. It can be expected that EDS will continue to pressure GM to acquire all SI and systems operations business from Hughes.

INPUT expects HITC to continue to protect its DoD investment at the expense of new commercial business. This will make it easier for EDS to expand its civil federal and commercial SI practice using HITC, HSTX, and HLS as consultants. Mr. Michael Armstrong's long-time friendship with Mr. Lester Alberthal, president and CEO of EDS, will make it easier for EDS and HITC to develop a strong symbiotic business relationship.

HAC has restructured itself from seven operating groups into five sectors. The main design of this restructuring was to separate defense work from commercial work. It may be difficult for HAC to separate its personnel into federal and commercial organizations without a devastating impact on the overhead costs for federal proposals.

During the next 18 months, HAC will absorb the missile division of General Dynamics and will start downsizing by more than 9,000 employees. Even though most of this will take place in California and within the defense manufacturing activities of HAC, these actions are expected to have some impact on HITE and HSTX, especially on their defense activities.

It is necessary to remember that HITE is a part of Hughes Aircraft, which, with its sister organization, Delco Electronics, makes up GM Hughes Electronics, which is a part of General Motors. Given this flow down the chain of command, it is easy for INPUT to see that HITE, at times, has little control over its destiny. Decisions that are made for the good of the total enterprise often may not make sense to outside observers.

INPUT believes that it will be difficult for HITE to remain focused on systems integration now that it has been combined with HSTX. This combination adds space products, LAN security products, and miscellaneous products like articulated robots to the mix.

INPUT feels that the real test for HITE will come this summer when the EOS-DIS contract is awarded. HITE needs this win to remain creditable. The win, however, will team it up with EDS, which is nearly 35 times as large.

In summary, INPUT feels that a better understanding of HITE will emerge over the next year. Any efforts to work with HITE during this period must be done very carefully because of the potential for reorganization if it does not win EOS-DIS and the potential for severe disruption of the organization if it does win.

## COMPANY PROFILE

---

**KPMG Peat Marwick 1. Key SI Contacts**

Jules Ghedina, Principal  
KPMG Peat Marwick  
3 Chestnut Ridge Road  
Montvale, NJ 07645

**2. Description of Principal Business**

KPMG Peat Marwick (Peat Marwick) is the professional services consulting organization of one of the original "Big 8" accounting and auditing firms. In its management consulting role, Peat Marwick offers systems advice and implementation services in functionally-defined markets ranging from banking and finance to manufacturing and transportation. Its customers include all levels of federal, state, and local governments, and both wholesale/distributor and retail businesses.

KPMG Peat Marwick's systems integration practice includes the Nolan, Norton & Co. unit, which specializes in corporate IT strategy and business transformation planning; Peat Marwick Advanced Technology, which specializes in CASE, re-engineering, telecommunications and data center management services; Runaway Systems Management services, which specializes in salvaging out-of-control SI projects; the Executive Technology Center, which provides services for technology prototyping and solution demonstration; and Strategic Research Services, which provides technology, business, regulation and economic research.

In 1988 and 1989, Peat Marwick's total SI business grew from approximately \$185 million per year to \$220 million per year; it was divided between commercial and federal projects, as shown in Exhibit KPM-1.

EXHIBIT KPM-1

**KPMG Peat Marwick SI Business,  
1988 and 1989**

Market Sector	1988 (\$ M)	1989 (\$ M)
Commercial	110	130
Federal	75	90

Since the beginning of 1988, Peat Marwick has started more than 120 SI contracts, divided between commercial and federal clients in a ratio of 5:1. The company estimates its average contract values are more than \$5 million for commercial contracts and more than \$10 million for federal contracts. In concert with other SI services vendors, Peat Marwick estimates that contract values in both the commercial and federal markets are increasing.

### 3. Competitive Position

As an auditing and management consulting firm, Peat Marwick has had to be able to recognize and rectify business problems in a great variety of business clients. As an SI contractor, Peat Marwick can not only trade on its reputation, but can offer unique products and services to the marketplace, as shown in the sample of its offering presented in Exhibit KPM-2.

### 4. Markets Served

KPMG Peat Marwick projects a commanding presence throughout the business and government marketplaces. INPUT asked the company to identify its primary target markets; KPMG Peat Marwick identified its SI business marketing focus as being in the following vertical markets:

- Banks
- Health care
- Insurance
- Manufacturing/high technology
- Merchandising businesses
- Government (all levels)
- Transportation
- Energy/Utilities

These markets appeal to KPMG Peat Marwick for the following reasons:

- They are characterized by large, complex information technology organizations
- They have a history of consultant use
- They show clear industry trends of growth and complexity
- They often have complex, transaction-based internal operations

## EXHIBIT KPM-2

**KPMG Peat Marwick Technologies and Target Applications**

Peat Marwick Technology	Target Application
CASE/Design Methodology <ul style="list-style-type: none"><li>- Application Engineering Methodology</li><li>- Life Cycle Builder</li></ul>	Application development  System integration
Industry-specific Software <ul style="list-style-type: none"><li>- FAMIS</li><li>- STARS</li></ul>	Federal, state, and local government accounting systems
Connectivity Products <ul style="list-style-type: none"><li>- MacDSS</li></ul>	Macintosh systems integration and decision support/ executive information systems
Project Management Processes	Runaway Systems Management Methodology
Data Management Products	Data Tec: bottom-up data name rationalization
Network Management Products	FIRMNET network design methodology
Strategic Systems Planning Processes	Methodology for linking business strategy to IT investments

**5. Recent Events**

Consistent with its background in accounting/auditing and management consulting, Peat Marwick is reluctant to disclose its work for clients, unless such activities are made public by the clients themselves.

## 6. SI Organization

Peat Marwick is a client-oriented organization. As such, nearly all functions of a Peat Marwick office are decentralized; excepted are the steering functions of long-range strategy and planning, and overall marketing and promotion, as shown in Exhibit KPM-3. The company maintains nearly 1,000 full-time SI-assigned staff, almost two-thirds of whom are assigned to full-time commercial SI activities.

EXHIBIT KPM-3

### KPMG Peat Marwick SI Business Functions: Centralized/Decentralized

Responsibilities	Commercial	Federal
Strategy, long-range planning	B	B
Marketing & promotion	B	B
Account management, sales	D	B
Contract review & approval	D	B
Project management & control	D	D
Implementation & development	D	D
Hardware/software acquisition	D	D
Systems operations	D	D

(D = Decentralized, B = Both centralized and decentralized)

Peat Marwick's commercial and federal SI business operations both report to the national Partner-in-Charge of Management Consulting.

Peat Marwick, being a technical management specialist firm, devotes relatively less staff to implementation and more staff to management and management support, as shown in Exhibit KPM-4.

## 7. SI Business Objectives

Peat Marwick must live or die based on the strength of its reputation and its unique service and product offerings. Peat Marwick pursues its SI client business by focusing on the following:

- Instant value in the service sets
- Being a partner with the client
- Strategies, cost benefits, and fast delivery
- Outstanding project management
- Industry strengths from a consulting viewpoint

- Outstanding technology credentials, vendor alliances, and delivery system

Like many other professional services firms, Peat Marwick does not advertise in the public media—it does, however, use some direct mail. More effective than direct mail are presentations in public seminars and vendor-supported programs. Even more effective is word-of-mouth client referrals, due to the excellent reputations of Peat Marwick and its Nolan, Norton & Co. unit in their fields of endeavor.

## EXHIBIT KPM-4

**Distribution of SI Personnel--KPMG Peat Marwick**

Capability	Percent
Management, strategy & planning	15
Legal support/contract administration	5
Project management	20
Systems development/implementation	25
Hardware/software evaluation/acquisition	15
Hardware engineering	5
Sales	15

**8. SI Capabilities Evaluation**

Peat Marwick has developed a wide range of capabilities in its auditing and management services consulting history, which it can bring to bear on a wide range of client problems. Exhibit KPM-5 summarizes Peat Marwick's assessment of its strength in in-house capabilities and whether it routinely uses alliances to satisfy clients' requirements.

Peat Marwick has significant capability in every area identified in Exhibit KPM-5, except for service and repair. INPUT also notes that this company has alliances in areas where it is fully capable of performing by itself; thus, it strengthens not only its technical capability but its ability to respond more quickly to a client's needs.

INPUT's evaluation of Peat Marwick's capabilities is high. Its strengths include not only a high level of technical and management expertise, but also alliances to fill in or enhance already high levels of expertise and readiness. INPUT believes that Peat Marwick is fully capable in both technical and management areas; in particular, INPUT notes that this company has built a solid reputation in the area of retrieving projects that a company (or a previous contractor) has lost control of (Runaway Systems Management).

## EXHIBIT KPM-5

### KPMG Peat Marwick Assessment of SI Capabilities and Use of Alliances

Capability	Strength (High/Medium/Low)	Alliance (Yes/No)
Strategy Services	High	No
Business Consulting	High	No
Design Methodology	High	No
Design/Integration	High	No
Project Management	High	No
Software Development	High	No
Education/Training/ Documentation	Medium	Yes
Packaged Applications Software	High	Yes
Packaged Systems Software*	High	Yes
Standard Computer Hardware*	High	Yes
Custom Computer Hardware*	Medium	No
Communications Hardware*	High	No
Network Design	High	No
Service and Repair	(No capability)	N/A
Software Maintenance	Medium	No
Information Technology Strategy	High	No

\*Evaluation and Selection Services only

#### 9. SI Strategic Alliances

Peat Marwick's strategy is to use alliances selectively to enhance its own capabilities and improve its response times. The company uses both long-term agreements and contract-by-contract arrangements, as follows:

- Long-term agreements are used to develop critical technologies and/or address specific markets
- Contract-by-contract arrangements are used to put together the exact combination of skills, experience and technology needed to provide the client with a total business solution.



Exhibit KPM-6 identifies the salient points of Peat Marwick's alliance strategy. It is clear that, with its strength in management consulting, Peat Marwick views alliances not only as capability enhancements but also as additional resources.

Exhibit KPM-7 identifies some of Peat Marwick's major alliances.

EXHIBIT KPM-6

### KPMG Peat Marwick's Alliance Strategy

- Offer clients a full range of high-quality SI services
- Joint marketing efforts (seminars, lead sharing, etc.)
- Provide industry- and technology-specific expertise
- Fast delivery of technology needs
- Improve direct access to marketplace

EXHIBIT KPM-7

### KPMG Peat Marwick Strategic Alliances

Company	Purpose of Alliance
Apple Computer	Decision Support/Executive Information Systems Macintosh connectivity
Businessland	Total solutions in LAN environments Desktop/LAN-to-mainframe integration
ODR, INC.	Organizational change management methodology
XA Systems	Software engineering/CASE tools
Brightbill Roberts	Object-oriented software environment
IBM	AS/400 systems integration
Unisys	Open system architecture, CASE, 4GL tools, image processing, EDI, manufacturing application integration

## 10. SI Capabilities Summary

Peat Marwick has nearly all the SI capabilities required to fully compete in the SI marketplace. Choosing not to offer equipment service and repair, Peat Marwick nevertheless can present itself as a full-service, single-source SI services vendor if it chooses its SI target projects carefully.

Peat Marwick's strengths are in the functional areas of management and control. Thus, rather than trying to meet all the needs of the financial and banking industries, for instance, it has developed augmented capabilities through its alliances in functional areas such as:

- Strategic systems planning
- Decision support/executive information systems
- Organizational change management
- Software engineering and CASE tools
- Minicomputer (AS/400)-based office information systems
- Cooperative processing application environments

Exhibit KPM-8 summarizes Peat Marwick's capabilities.

EXHIBIT KPM-8

### INPUT's Evaluation of Peat Marwick's SI Capabilities

Strengths	Weaknesses
Project management expertise and processes Strong set of tools & methodologies Vertical industry knowledge Connectivity products	Equipment service and repair

## 11. SI Marketing Strategy

Peat Marwick follows a function-oriented marketing strategy that leverages its strengths in technological and management problem areas. (See also Section 4, Markets Served.) This company derives all of its federal SI business from responding to requests for proposals (RFPs). Commercial SI business is gained from RFPs (40%), proactively leveraging existing clients (40%), and direct marketing (20%). Peat Marwick is one of very few companies offering SI services that successfully uses direct mail as a business marketing tool.

- Competitors: Exhibit KPM-9 identifies Peat Marwick's principal competitors in the SI market.

EXHIBIT KPM-9

Peat Marwick's SI Competition	
Commercial	Federal
IBM	CACI
DEC	CSC
EDS	EDS
CSC	
Ernst & Young	
Andersen Consulting	

- Positioning: Peat Marwick presents the same set of capabilities to both commercial and federal clients. Peat Marwick presents its strength as lying in the technical management arena; especially strong is its ability to snatch a project from the brink of death, when it has already gotten out of control, and return it to the client healthy.
- Promotion: Peat Marwick does not advertise in the public or trade media. It uses public seminars and vendor-supported programs to good advantage (Peat Marwick rates the response to these efforts as "medium"). Even more effective is word-of-mouth client referrals (rated "highly effective"). Peat Marwick rates direct mail as relatively ineffective, yet approximately 20% of its commercial SI work results from direct mail marketing.

Exhibit KPM-10 presents a summary of Peat Marwick's marketing approach.

## 12. SI Customer Base

Peat Marwick reports that it gains 60% of its federal SI business from new accounts; 80% of its commercial SI business is derived from new accounts. Both commercial and federal SI undertakings are profitable.

Peat Marwick declined to identify any clients or SI projects, claiming client privilege.

## EXHIBIT KPM-10

**KPMG Peat Marwick's Marketing Strategy**

- Marketing and promotion through both centralized and decentralized units
- Leverage existing commercial clients
- Functional market focus
- Primary competitors: IBM, DEC, EDS, CSC, CACI, Ernst & Young, Andersen Consulting
- Positioning: technical (especially, project management)
- Promotion: Public programs, word-of-mouth

**13. Summary and Future Directions**

Peat Marwick's strengths include its management consulting expertise, its project management skills and experience, especially involving organizational changes, and its software design and development capabilities. In addition, its alliances provide strength in areas where Peat Marwick is weak.

On the negative side, Peat Marwick currently chooses not to offer services in the areas of equipment service and repair.

Peat Marwick declined to disclose any information about its management structure; however, its longevity attests to the effectiveness of its management practices.

Lacking information about Peat Marwick's revenues and organization, INPUT can make only limited comment about Peat Marwick's future. Peat Marwick has, however, revealed that it does have strong abilities in a number of areas. Also, Peat Marwick has developed an effective group of alliances. Clearly, Peat Marwick has been successful at what it chooses to pursue. Peat Marwick appears to have set a viable direction for its SI opportunities. With care in choosing its projects, it should compete very successfully.

## COMPANY PROFILE

---

### Litton Industries

#### 1. Key SI Contacts

Litton Industrial Automation Systems, Inc.  
2310 Litton Lane  
Hebron, KY 41048  
(606) 334-3400

Litton Unit Handling Systems  
2200 Litton Lane  
Hebron, KY 41048  
Keith Wheeler, General Manager  
(606) 334-3400

Litton Computer Services  
4747 Hellyer Ave.  
P.O. Box 210059  
San Jose, CA 95151-0059  
Mr. Ray Wolfe, Vice President  
(408) 363-2561

#### 2. Description of Principal Business

Litton Industries strives to be a recognized technology innovator of products and services for commercial and defense markets around the world. It has spent about \$500 million annually for the past five years to maintain a market leadership position in its core businesses. It also believes that worldwide commercial activities will continue to be the primary source of future growth.

Litton Industrial Automation Systems/Unit Handling Systems (LIA/LUHS), headquartered in Hebron, KY, provides integration services primarily to the manufacturing, wholesale, and transportation industries. The division develops and integrates high-volume production systems for the manufacture of automotive engines, transmissions and welded body assemblies as well as automated data collection systems and automated material handling systems. It also uses computer-based technologies to manage projects for its customers.

Litton Computer Services (LCS) provides processing, professional services, and SI to government and commercial clients. The company also provides processing services support to its parent company, Litton Industries.

LCS provides processing services to over 600 customers from a single data center. For over two decades LCS has provided continuing support to the U.S. military and space programs in the areas of systems design, development, and software engineering. Offices are located in San Diego, CA, New York, NY, Dayton, OH, Columbia, GA, Colorado Springs, CO, Montgomery, AL and Washington, DC.

Litton has been in the federal systems integration market for 10 years and in the commercial systems integration market for seven years.

LCS offers outsourcing on IBM mainframes running IBM's proprietary operating systems and running its services over a proprietary network. This might be appropriate for the older legacy application systems. LCS also provides services over LANs.

### 3. Company Competitive Position

Although the outsourcing market is not the subject of this profile, much of a company's abilities to generate systems integration work depends on its involvement with the activities that take place when a company "rightsizes" as it outsources. Litton's service has been based on large mainframe-class machines running mainframe operating systems.

LCS has provided remote manufacturing requirements planning (MRP) service based on the original Cullinet application software. Computer Associates now owns the rights to this offering. Litton plans to offer a different on-line batch MRP package.

Litton's success with the Distribution Standard System (DSS) of the Defense Logistics Agency (DLA) represents the ability of two Litton SI organizations to work together on a major federal industrial system. They were able to leverage their computer experience and their warehousing and distribution experience to review existing DLA computer-based warehousing systems and to recommend a standard warehouse. Litton was able to perform the functional economic analysis needed by DLA to present its business case to DoD for a new computer-based warehouse system.

### 4. Markets Served

Much like EDS, Litton applies resources from throughout the corporation for the implementation of SI projects; consequently, at present Litton has no centralized or dedicated organization for SI. Since Litton focuses on large projects, the number of professional personnel dedicated to SI efforts can vary significantly.

Exhibit LI-1 summarizes the key parameters of Litton's SI business.

EXHIBIT LI-1

**Parameters of Litton's SI Business**

Parameter	LCS	LIA/UHS
Average staff involved in SI contracts	200	25
Average staff involved in federal SI contracts	150	7
Projects started or completed since 1990	8	6
Annual revenues from systems integration*	\$30M	\$145M

\*INPUT's Estimate

Exhibit LI-2 summarizes Litton's markets.

EXHIBIT LI-2

**Summary of Markets**

Vertical Markets	Cross Industry
Aerospace	Advanced manufacturing
Automotive	Distribution
Electronics	
Food	
Beverage	
Federal government	

Litton would not disclose its annualized revenue from systems integration efforts, but INPUT estimates it to be near \$175 million worldwide.

LCS provides professional services to the federal government in the areas of space systems, logistics systems, and engineering services.

- Areas of expertise include systems engineering, analysis, and integration; systems modeling and simulation; command and control; feasibility studies; management information systems; and development of real-time systems.
- LCS is the prime contractor for the U.S. Air Force Reliability and Maintainability Information System (REMIS).
  - This systems integration project will give the Air Force the ability to retrieve reliability and maintainability logistics data worldwide. REMIS will support more than 2,000 users throughout the major command, air logistics centers, and technology repair centers.
  - The system consists of five geographically distributed Tandem VLX computers and hundreds of terminals.
  - The current value of this ten-year program is \$115 million.
- Under an \$85 million contract with the Royal Saudi Air Force (RSAF), LCS developed an integrated logistics management system for fielded weapon systems.
  - This system provides separate real-time data bases for project monitoring/management, maintenance management/control, and supply and inventory control/management; a centralized data base, with a distributed secure network; an individual weapon system orientation; high weapon systems, subsystems, and components visibility; and configuration status/accountability management.
  - LCS has provided system definition, facility construction, hardware selection and installation, all software development, training, and operation and maintenance of the completed system.
- For over two decades LCS has provided continuing support to U.S. military and space programs in the areas of systems design, development, and software engineering.



- Since 1965, LCS has served as the real-time data systems software development contractor to the U.S. Air Force Satellite Control Facility. In this role, LCS has developed software for orbit support, satellite command and control, telemetry evaluation, and communications. Software support provided by LCS includes analysis; design; coding; configuration management; specification development; integration, test, and evaluation; verification and validation; program maintenance; documentation and library maintenance; and management and consulting.
- In 1991 LCS was awarded a five-year contract by IBM to continue its work. IBM is now the single prime contractor.

LCS provides processing services to over 600 clients from its data centers.

- LCS offers dedicated machine environments, and general financial, data base, and utility processing services as well as access to the following applications:
  - Medical Eligibility Data Base
  - Litton Common Information System (LCIS)
  - Accounts Payable System
  - Customer Information System
  - Distribution Transaction Data Base System
  - Facilities Management System
  - LCIS Budget Entry System
  - Financial & Consolidation System
  - Fixed Asset Control System
  - Hazardous Material Reference System
  - Ledger System
- LCS's processing customers come from a range of industries.

LCS's professional services revenue is derived primarily from LIA/ LUHS defense agencies of the federal government. Its industrial SI practice derives about 5% of its revenue from the federal government.

## 5. Recent Events of Interest

### a. Litton Computer Services

Litton is part of the IBM team that won a \$38.5 million contract, with four one-year extensions, to supply the command and control segment (CCS) of the Air Force Satellite Control Network (AFSCN). Litton will provide data base and software development, and maintenance and

operations support. This is a continuation of work that LCS has had since 1965. IBM will be providing systems engineering and commercial hardware maintenance. The LCS efforts will be the professional services component of an SI application.

#### **b. Litton Industrial Automation/Litton Unit Handling Systems**

Litton has been awarded a \$5.5 million contract by Kmart Corporation to provide an automated material handling system for Kmart's new distribution center in Atlanta.

LUHS is supplying the sorting and conveyor equipment, and will integrate the system into the Kmart facility. Litton Software Systems in San Diego, CA will provide a shipping manifest system. The Intermec Division of Litton is providing radio frequency bar coding units.

#### **c. Other Awards**

Various other awards to Litton include:

- A \$17 million contract to develop and install an automated materials handling system for General Motors Corp.'s Vauxhall Motors subsidiary in Luton, England
- A multimillion dollar contract to develop and install an automated materials handling and control system for American Airlines Inc.'s terminal at Alliance Airport, Fort Worth Texas
- A contract to install a plantwide material management information system at Chrysler Corp.'s Acustar electronics component facility in Huntsville, AL. The system will integrate material management and control systems.
- A three-year, \$25 million contract for an integrated engineering drawing and management system for Boeing Aircraft Co.
- A contract to integrate process and material management for the electronics manufacturing division of Unisys

#### **d. Intermec Corporation**

In order to expand its commercial offerings, Litton acquired Intermec Corporation at the end of 1991. Intermec is a leader in automated data collection. It pioneered the development of bar codes for industrial use. This gives Litton an automated data collection capability for control of material, work in process, finished goods, quality, distribution, and employees' time.

Joseph E. Beebe, who had been Vice President of Operations at Intermec, has been named President of Litton's Material Handling Systems division. This should aid in merging Intermec products with other Litton offerings.

## **6. SI Organization**

Litton does not identify any single organization as its center for systems integration. Two groups have been identified in this profile. Other Litton divisions may also participate in SI engagements, depending on the individual opportunity.

## **7. SI Business Objectives**

### **a. Litton Computer Services**

LCS has been operating advanced, large-scale data processing centers since 1968. It serves as the total information system for some clients; it serves as overflow capacity for growing businesses or those changing rapidly because of acquisition or reorganization. Litton's ultimate goal is to help customers achieve a competitive edge through a strong information system.

LCS plans to capitalize on its skill in managing risk and capacity to win profitable contracts in SI. It has found that SI contracts will allow it to control its account base, add to its facilities management contracts, and strengthen its non-SI business.

### **b. Litton Industrial Automation/Unit Handling Systems**

LIA/LUHS offers two software products: the Litton Automated Warehouse control system and the Litton Automated Manufacturing Cell Controller. It uses these packages as part of its total sales approach. It also stresses the benefits of using SI and network-based distributed computing in industrial activities.

Like LCS, LIA/LUHS will use its SI capabilities in project management and client relationships to control its account base and to strengthen its non-SI business.

## **8. SI Capabilities Evaluation**

LCS has positioned itself in the vertical markets of federal government and aerospace and in the functional area of manufacturing. In addition, LCS promotes its skill in design methodology, design/integration, project management, software development, and standard computer hardware. Its strengths in network management and operations, and software maintenance are also valuable to customers.

To supplement some lack of capabilities in its packaged applications and packaged software systems, LCS supplements these areas with alliances. It has no formal alliance program.

As with many vendors, LCS finds that customer referral and word of mouth are the most effective means of generating new business opportunities. It also uses public seminars with moderate success and advertising with less success.

LIA/LUHS has a focused list of SI capabilities. Its skills in design methodology, design and integration, project management, service and repair, and software maintenance are of the most value to clients.

Because of the importance of packaged systems software to its clients, LIA/LUHS has supplemented its capabilities with alliances. It uses alliances to supply capabilities in packaged applications software and standard computer hardware.

LIA/LUHS has expertise in advanced manufacturing, applications engineering, systems engineering, and software engineering in addition to its more traditional SI capabilities.

## **9. Strategic Alliances**

Although LCS has no formal alliance program, the company does make extensive use of partners/alliances on a contract-by-contract basis. The reasons vary dramatically, but include the need to:

- Supplement professional services staff in a particular geographic location
- Provide hardware and software support

LCS has conducted implementation in a wide variety of hardware environments.

LUHS has established alliances with IBM, DEC, and Allen-Bradley. It uses products and some services of IBM and DEC.

## **10. SI Capabilities Summary**

Exhibit LI-3 gives a summary of Litton's SI capabilities.

## EXHIBIT LI-3

**Summary of Litton's SI Capabilities**

1. Federal government/defense contract experience
2. Advanced manufacturing experience
3. Network design, implementation, and project management skills
4. Implementation experience on various hardware environments
5. Industry-specific software—finance/manufacturing

Litton's systems integration offerings include:

- Network design, implementation, and management skills developed as a result of years of experience in processing services
- A broad range of in-house expertise in the utilization of a variety of standard and customized hardware environments gained through LCS's work with other contractors, and alliances on specialized defense contracts
- Industry-specific software and experience in the manufacturing, retail, finance, and insurance vertical sectors

**11. SI Marketing Strategy**

As systems integration becomes more specialized, there will be a growing demand for information and control systems that will increase quality, reduce costs, and improve responsiveness. Litton's customers will demand of their systems integrators knowledge not only of a specific industry, but also of the manufacturing process. Litton is positioning itself for these market requirements.

IBM, CSC, MMDS, and EDS are Litton's chief competitors. With EDS's acquisition of McDonnell Douglas Systems Integration, EDS could become a stronger competitor to both LCS and LIA/LUHS in the federal and commercial marketplaces.

LIA/LUHS views all of the Big 6 accounting firms as competitors to its commercial practice. Eaton-Kenway, Harnischfeger Engineering and EDS are competitors in federal SI practice.

## 12. SI Customer Base

Although LCS is reluctant to discuss particular projects, INPUT is aware of at least three projects of significance. The first is the U.S. Air Force Reliability and Maintainability Information System (REMIS). This systems integration project will provide the Air Force with the ability to retrieve reliability and maintainability logistics data on a worldwide basis. REMIS will support more than 2,000 users throughout the major commands, air logistics centers, and technology repair centers. The system consists of five geographically distributed Tandem VLX computers and hundreds of terminals. INPUT believes that the value of the project is in excess of \$100 million over a ten-year period. This type of project would be consistent with Litton's stated objectives of participating only at the large-contract end of the spectrum.

In addition, LCS holds an \$85 million contract with the Royal Saudi Air Force whereby Litton has developed an integrated logistics management system.

LCS and LIA/LUHS have cooperated on the Defense Logistics Agency (DLA) Distribution Standard System (DSS), designed under the DoD CIM initiative to be the architecture for DoD supply depots. As the program proceeds from the SI activities of system architecture and program management to operations, LCS will assume more of the responsibility for the program.

LIA/LUHS customers include:

- Kmart Corporation
- General Motors Corp.'s Vauxhall Motors subsidiary, Luton, England
- American Airlines Inc.'s terminal at Alliance Airport, Fort Worth Texas
- Chrysler Corp.'s Acustar electronics component facility in Huntsville, AL
- Boeing Aircraft Company
- Unisys

### 13. Summary and Future Directions

To date, LCS's experience in SI has been highly specialized and heavily weighted toward the defense arm of the federal government. Although the company claims one major commercial contract, it remains to be seen whether Litton can convert LCS' federal experience into commercial marketplace contracts. INPUT's view of LCS's strengths and weaknesses is summarized in Exhibit LI-4.

EXHIBIT LI-4

#### LCS's Strengths and Weaknesses In SI

Strengths	Weaknesses
Government experience	Market perception
Program management skills	Business consulting skills
Network development/management	Lack of commercial experience
Strong resource base	

LCS has a good track record, and certainly possesses the technical skills and financial resources to become a more significant player. INPUT believes that Litton will remain a low-profile and specialized player in the short term and will work in its established areas of expertise on very large projects.

Much of LCS's future in commercial systems integration depends on its ability to move from its current mainframe mindset to the more flexible client/server "rightsizing" mindset necessary to develop new systems integration customers. Its success will also depend on its ability to develop and implement a commercial marketing strategy.

LCS is one of the last surviving remote computer service vendors and appears to have a niche in which it is comfortable. It is in the process of moving to client/server and other concepts of modern system architecture.

Litton has identified the need to put more resources into commercial integration efforts. Unlike some of the other major DoD integrators who are slowing their commercial efforts, Litton continues to strengthen its ability to be a commercial systems integrator.

The future role of LCS in systems integration is currently uncertain. It is firmly established in a niche market but reluctant to expand its offering. Business direction will probably result from simply supporting the efforts of other divisions.

As part of Litton, LIA/LUHS must contend with the restrictions to open communications that are prevalent in most defense contractors. It is deriving more of its commercial SI revenue from new accounts and is achieving increased profit margins. This division of Litton should continue to prosper.

Both Litton systems integration groups have found that it is far easier to develop new business from existing federal clients than to develop new business from other federal clients.

In summary, INPUT feels that Litton has the SI capabilities and potential to pursue a successful commercial SI strategy. Much will depend on how well it is able to adopt the new computing paradigms.



## COMPANY PROFILE

---

### Lockheed

#### 1. Key SI Contacts

Lockheed Corporation  
4500 Park Granada Blvd.  
Calabasas, CA 91399  
(818) 876-2000

Lockheed Missiles & Space Systems Group

Lockheed Missiles & Space Company

Lockheed Integrated Solutions Company  
881 Martin Avenue  
Santa Clara, CA 95050-2903  
Theodore A. Sieverson, VP  
(408) 987-4615

Lockheed Technology Services Group

Lockheed Information Management Services Company  
300 Frank W. Burr Blvd.  
Teaneck, NJ 07666  
John M. Brophy, President  
(201) 692-2900

FORMTEK, Inc.  
661 Andersen Drive  
Pittsburgh, PA 15220  
Mr. Ali Kutay, President CEO  
(412) 937-4900

#### 2. Description of Principal Business

Lockheed Corporation, headquartered in Calabasas, CA, ranks as the ninth largest Department of Defense (DoD) contractor and the second largest NASA contractor. The corporation had sales of approximately \$10 billion in 1991 and employs about 71,400 people.

Lockheed is a world leader in defense, electronics, and space systems technology, designing and producing missiles, satellites, and military aircraft as well as providing a wide range of government and commercial aeronautical, space, environmental, and engineering services.

Lockheed's primary businesses embrace research, development, and production of aerospace products and systems. During 1991, approximately 85% of sales were to the U.S. government—70% in defense programs and 15% in nondefense. Sales to foreign governments accounted for 6% of revenues and sales to commercial customers 9%.

Lockheed's operating companies are aligned into four major groups:

- Missiles & Space Systems
- Aeronautical Systems
- Technology Services
- Electronic Systems

### **Missiles & Space Systems Group**

The Missiles & Space Systems group comprises military and civilian space systems, strategic fleet ballistic missiles, and tactical defense and communications systems.

Missiles & Space Systems is Lockheed's largest operating group and a leading provider of spacecraft, space instruments, space operation services and support, technology for military and civilian exploration of space, defensive missiles, and fleet ballistic missiles. This group provided \$4.9 billion in revenue or 50 % of total sales in 1991. Funded new business contracts of \$5.4 billion were a record high. The funded backlog totaled \$3.7 billion.

Lockheed Missiles & Space Co. (LMSC) is headquartered in Sunnyvale, CA. The company has four operating divisions: Missile Systems and Space Systems in Sunnyvale; Research and Development in Palo Alto, CA; and LMSC in Austin, Texas.

LMSC is distinguished by its strong, leading edge technology and its reputation as a top systems integrator. The company is known for providing innovative solutions to tough technical problems—at an affordable cost.

LMSC's legacy is based on a history of developing all of the U.S. Navy's submarine-launched fleet ballistic missiles and the largest number of spacecraft.

The outlook for LMSC's future is strong. Despite the current downturn in defense budgets, LMSC's technological and systems integration expertise make it a qualified competitor for emerging business opportunities that could exceed \$18 billion over the next year.

With contracts totaling approximately \$1 billion, the company has a major role in NASA's Space Station Freedom program. NASA has divided the project into three work packages. As a major subcontractor on all three, LMSC is helping to develop and outfit the modules where the crew will work and live, it is working on the systems and tools astronauts will use to assemble Freedom in orbit, and it is constructing solar arrays for the system that will provide Freedom's electrical power. The company is also the prime contractor on a \$260 million program to automate the design and development of software for the Freedom program.

Lockheed Integrated Solutions Co. (LISC), headquartered in Santa Clara, CA, offers computer solutions to federal, civilian, and Department of Defense agencies and state governments. LISC is focused on key technologies within the systems integration market. Recently awarded programs include multi-user computer networks for the Department of Veterans Affairs and the application of automated data collection to commercial vehicle traffic on major highways. LISC's skills include network and application software and database integration. When combined with training, installation, and maintenance services, LISC provides life cycle solutions.

Lockheed Integrated Solutions is the provider to the Department of Veterans Affairs (VA) of the Nationwide Office Automation (NOAVA) contract, estimated to be worth \$300 million. These machines are going to 167 VA medical centers nationwide.

Based in Sunnyvale, CA, Lockheed Technical Operations Co. (LTOC) provides engineering, testing, and training services to the U.S. Air Force. Under a multimillion-dollar contract from the USAF Space Division, LTOC supports the Consolidated Space Test Center at Onizuka AFB in Sunnyvale. LTOC recently won a re-competition of this contract worth in excess of \$185 million plus award fees. A major thrust of this program is the command and control of space vehicles, including real-time tracking, telemetry, and spacecraft control operations. Lockheed has provided these services continuously to the Air Force for over 30 years. LTOC also provides support to Granite Sentry in the NORAD Cheyenne Mountain Complex.

### Aeronautical Systems Group

Under a 1990 restructuring plan, Lockheed Aeronautical Systems Co. centralized its operations and established headquarters in Marietta, GA. The company is best known for the design and production of cargo, antisubmarine warfare, maritime patrol, and fighter aircraft.

The Lockheed Advanced Development Co. (LADC), better known as the Skunk Works, was established as a separate company in May 1990. LADC headquarters, presently in Burbank, CA, will move to Palmdale, CA, in late 1993.

Lockheed Aircraft Service Co., headquartered in Ontario, CA, is a leader in the design, systems integration, and modification of aircraft into special airborne platform configurations for electronic warfare; command, control and communications; special operations; and other high-technology applications.

The Aeronautical Systems group comprises design and production of special-mission and high-performance aircraft and systems for military and civilian operations, for airlift, for antisubmarine warfare, and for reconnaissance and surveillance.

Lockheed's Aeronautical Systems Group is a long-standing leader in the design and production of cargo aircraft, tactical fighters, and special mission aircraft.

Aeronautical Systems contributed \$2.2 billion in revenue, 22% of Lockheed's sales in 1991. The funded backlog for this segment totaled \$3.2 billion.

### Technology Services Group

The Technology Services segment comprises space shuttle processing, engineering sciences and support, aircraft modification and maintenance, and civilian operations, for airlift, for antisubmarine warfare, and for reconnaissance and surveillance.

Lockheed Air Terminal, located in Burbank, CA, is an airport management and aviation services company. Its main line of business is the development, operation, and management of commercial airport and airport terminal facilities worldwide.

Lockheed Information Management Service Company (Lockheed IMS), headquartered in Teaneck, NJ, is a leading provider of data processing and systems integration services for both the public and private sectors.

Lockheed IMS works in partnership with more than 30 states and 120 cities and counties throughout the U.S. and abroad to identify and solve complex revenue-related issues. The company specializes in four service areas:

- **Municipal Services**—Incorporating parking ticket processing and collection, parking management consulting, moving violation processing, and collection and emergency medical services billing and collection

- Transportation Systems and Services—Comprising intelligent vehicle highway systems, electronic toll and traffic management, heavy vehicle registration processing, and heavy vehicle fuel tax processing
- Children and Family Services—Including child support services, child welfare services, and electronic benefits transfer
- Regulatory Systems and Services—Including the development of software systems that will facilitate private industry's compliance with governmental rules and regulations for tracking, controlling, and reporting the use of environmentally sensitive materials

Lockheed IMS recently announced the receipt of new contracts in California, New York, and Massachusetts to assist with child support collections, payments, and processing. The largest win was a \$75.5 million contract to develop a statewide automation program for all of California. The system is expected to increase the state's child support collections by more than \$135 million a year.

Lockheed Engineering & Sciences Co. (LESC), headquartered in Houston, TX, is a wholly owned subsidiary of Lockheed Corp. The company provides technical support services to U.S. government agencies in several key technologies. LESC currently supports range engineering, operations, and maintenance; propulsion testing and spacecraft materials analysis; spacecraft payload development; high-energy laser testing; computer software and hardware development; maintenance and operations; and space life sciences.

Lockheed Environmental Systems and Technologies Co. (LESAT), headquartered in Houston, TX, is a wholly owned subsidiary of Lockheed Corp. LESAT, formed as a separate company in June, will focus on opportunities in the growing environmental services and remediation market. LESAT provides technical and management support to the Environmental Protection Agency in environmental monitoring and remote sensing programs in Las Vegas and in an environmental services assistance team program headquartered in Arlington, VA.

The 6,400 Lockheed employees on NASA's shuttle processing contract (SPC) team at Kennedy Space Center in Florida are responsible, with approximately 1,500 team members from other companies, for all shuttle ground processing tasks as well as the launching and recovery of the space shuttle fleet. As the SPC team leader, Lockheed Space Operations Co. (LSOC), headquartered in Titusville, FL, is also responsible for overseeing the operation of the ocean-going ships that retrieve the reusable solid rocket boosters, and for facilities and systems operations maintenance at Kennedy Space Center. LSOC also performs certain space-related responsibilities for the U.S. Air Force.

The Technology Services Group was formed in 1989. Nearly half of the work in Technology Services is associated with NASA programs. Responsibilities include ground processing of the space shuttles and engineering and sciences support for other major NASA operations. It also provides aircraft modification and maintenance, operates airports, and specializes in data processing and systems integration primarily for public sector clients. Lockheed Information Management Services is a part of this group. In 1991, new business initiatives developed more slowly than anticipated because of start-up problems and the general downturn in the national economy. By year-end, however, business volume in these areas began to improve. Technology Services contributed revenues of \$1.6 billion in 1991, 17% of Lockheed's sales.

### Electronic Systems

The Electronic Systems segment comprises development and manufacture of radar frequency, infrared, and electro-optic countermeasures systems; airspace management systems; surveillance systems; automated equipment; antisubmarine warfare systems; microwave systems; fire control systems; and manufacture and distribution of computer graphics equipment.

The Electronic Systems Group serves military and industrial customers. Total 1991 sales were \$1.1 billion.

Lockheed acquired Sanders Associates, a leading defense electronics firm, in 1986. In 1990, Lockheed Electronics Co. was merged with Sanders to form Lockheed Sanders Inc., headquartered in Nashua, NH.

Headquartered in Anaheim, CA, CalComp became a Lockheed company in 1986 with the corporation's acquisition of its former parent company, Sanders Associates. CalComp's two product groups produce more than 100 products for the plotter, printer, and digitizer markets. Computer Graphics Group in Anaheim manufactures an extensive line of plotters and printers, using several technologies. Digitizer Products Group in Scottsdale, AZ, produces small- and large-tablet digitizers—input devices for converting a drawing's points, lines, and curves into data understood by a computer.

Headquartered in Hudson, NH, the Lockheed Commercial Electronic Co. specializes in providing high-quality, cost-competitive manufacturing services. It is recognized as a leader in just-in-time and other innovative production techniques that enable it to respond efficiently to customers' requirements for contract manufacturing services.

Lockheed Canada Inc., headquartered in Ottawa, Canada, develops and produces electronic warfare and antisubmarine warfare systems and products for the Canadian government and commercial markets. It also provides marketing services to all Lockheed companies doing business in Canada. On April 27, 1991, Lockheed purchased M.E.L. Defense Systems, Canada's leading supplier of maritime electronic warfare. It will merge with Lockheed Canada and strengthen Lockheed's core defense business.

### Other Companies

Lockheed Middle East Services is a Saudi joint-venture company established in 1982 and headquartered in Riyadh. The primary business concerns of Lockheed Middle East Services are installation, operation, maintenance and training for aircraft and aerospace equipment, and electronic and communication systems.

Lockheed Finance Corp. (LFC) is a wholly owned subsidiary of Lockheed Corp., engaged in financing activities that support Lockheed's customers and suppliers. LFC was established in 1977 and has expertise particularly in aircraft and aerospace-related equipment.

FORMTEK, Inc., a Lockheed Company, is a leading developer and integrator of Image-Based Document Management Systems for utilities and manufacturing firms. FORMTEK imaging systems allow users to electronically capture, store, view, revise, and distribute engineering drawings and related documentation throughout a department or location or across an enterprise.

As a pioneer in the development of raster editing for engineering, FORMTEK has led the industry in the design and implementation of new imaging technology and standards to facilitate data interchange. Today, FORMTEK has an installed base of thousands of users including some of the largest companies in the world.

FORMTEK was founded in 1982 and is headquartered in Pittsburgh, PA. It employs over 80 people and has offices in Alameda, CA; Philadelphia, PA; and Seattle, WA. FORMTEK Europe, a wholly owned subsidiary of FORMTEK, is headquartered in Brussels, Belgium, with an office in the U.K. There are also FORMTEK distributors in Europe, the Pacific Rim, the South Pacific, and South America.

FORMTEK was acquired by the Lockheed Corporation in October 1989. In addition to solidifying the company's financial position, the acquisition provided FORMTEK with access to an extensive range of Lockheed technical expertise and systems support personnel. The combination of Lockheed resources and FORMTEK's imaging technology allows FORMTEK to offer systems integration services and advanced imaging products that address unique utility, manufacturing, and engineering customer requirements.



In addition, Lockheed is working on a \$40 million program with the Department of Health and Human Services National Cancer Institute involving integrating a super computer with high-speed networking, parallel processor, and graphics workstation.

One of the major accomplishments in Lockheed's eyes during 1991 was that NL Industries ended its disruptive fight for control of Lockheed.

The other major accomplishment, which has given years of life to the company, is the win of the advanced tactical fighter program, which could be the largest contract award of the decade!

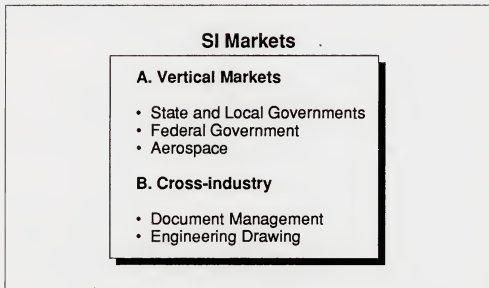
### 3. Company Competitive Position

Lockheed's strengths are its aerospace business and its aircraft maintenance business. As long as these remain strong, the company will remain strong. After losing in several recent competitive battles for new federal business, it appears that Lockheed is rethinking its systems integration strategies.

### 4. Markets Served

Lockheed's systems integration markets are shown in Exhibit Lockheed-1.

EXHIBIT LOCKHEED-1



### 5. Recent Events of Interest

In May 1992, Lockheed Corp. announced the formation of Lockheed Information Technology Co. (LITC), headquartered near Denver, to consolidate the corporation's information services functions. LITC was formed to improve service to Lockheed's computer users while reducing



overall costs by sharing computer resources now dispersed among individual Lockheed operating companies. Most of the savings from creating the new unit will result from equipment consolidation and a projected reduction of about 250 positions corporation-wide.

The Department of Veterans Affairs and Lockheed are putting in place a UNIX-based communications gateway that will link the NOAVA desktop machines with the VA's Decentralized Hospital Computer Program (DHCP). DHCP is written in Mumps and resides on DEC VAXes.

Lockheed has actively pursued several major procurements. Its inability to win these has discouraged some of its leadership from continuing to pursue federal business. Recent DoD initiatives like DMRD 918 and the PC Bulletin Board of DISA make it appear that future sales to DoD will be even more competitive and with lower margins. At least two of Lockheed's losses were Treasury Multi-user Acquisition Contract (TMAC), whose "best-value" criteria used to justify the award to AT&T is still being analyzed, and FAA Office Automation and Technology Services (OATS) contract.

#### Federal Activities

LISC holds the Nationwide Office Automation contract for the Department of Veterans Affairs (NOAVA).

- In September 1992, the Veterans Health Administration (VHA) was exempted from the mandatory provisions of the contract. VHA is only exempted if it can buy computers for 15% less than the contract price. VHA has been a highly decentralized operation and has been chafing under the requirements of the centralized procurement.
- In July 1992, the U.S. Department of Veterans Affairs completed its installation of a UNIX-based communications gateway provided by LISC. The NOAVA contractor has developed a system that enables VA users to exchange text and graphics that reside on different platforms. The gateway links NOAVA desktop microcomputers with the VA's Decentralized Hospital Computer Program (DHCP) that runs on DEC VAX minicomputers. Most of the NOAVA microcomputers are Everex, Inc. microcomputers. Some Apple Macintosh microcomputers and DEC minicomputers running ULTRIX are also included on the NOAVA system. The gateway is seen as a major breakthrough in linking VA and DoD hospital systems.
- VA and DoD are testing communications links in Albuquerque, NM, and Las Vegas. These two prototypes will test whether DoD and VA can negotiate sharing data on a large scale. The departments will test at least six upgrades to the gateway system over the next few months.

- Since Lockheed won the \$300 million, 10-year NOAVA contract in FY 1991, the company has been providing Everex, Inc., 386 microcomputers to 167 VA medical centers nationwide. Most medical center data resides on the MUMPS-based DHCP, which previously did not provide an MS/DOS interface.
- As originally awarded, NOAVA will update, connect, and consolidate office systems throughout the agency during the 1990s. It will be the VA's first concerted effort to apply the Government Open Systems Interconnection Profile (GOSIP) and POSIX standards in its automatic data processing operations.
- LISC uses Digital Equipment Corporation (DEC) as a major hardware supplier. DEC's VAXes have been the platform for the massive Decentralized Hospital Computer Program, the department's hospital information system, for almost a decade.
- Lockheed announced that other subcontractors include SSDS Inc., Everex Systems Inc., Apple Computer Inc., Hewlett-Packard Co., Sony Corp., Cabletron Systems Inc., Microsoft Corp., Unixplex Ltd., and Oracle Complex Systems Corp.
- The VA has 600 offices, cemeteries, and health centers nationwide, including 172 hospitals. Besides the hospitals, NOAVA will serve the VA Central Office in Washington and the National Cemetery System and the Veterans Benefits Administration.
- The NOAVA contract calls for five kinds of microcomputers: two MS/DOS machines, one running Apple's A/UX, laptops, and terminals. LISC also will deliver local-area networks, magnetic and optical storage devices, scanners, and other peripherals.

In January 1992, with NASA systems integration efforts to its credit, FORMTEK Inc. began moving to deliver document management systems across the government. The Pittsburgh company has delivered full-fledged systems for both NASA and the Navy, but has plans to serve the entire government market through a restructuring.

FORMTEK has solid relationships with both NASA and the Navy, where the company is part of a large engineering data management contract. At NASA, FORMTEK has delivered imaging hardware and software to support technical engineering for the space shuttle and space station programs. FORMTEK is also part of a project that supports many different NASA programs from an image management and archival standpoint.

The imaging systems enable NASA technical personnel to have immediate access to important technical documents. As part of its restructuring effort, FORMTEK established different programs focused toward particular markets, and NASA is one of them.

FORMTEK also is providing some of the key imaging software for the Navy's Engineering Data Management Information Control System (EDMICS) contract. EDMICS is a \$145 million contract to automate engineering data management at about 47 large Navy sites.

The Navy and the Defense Logistics Agency (DLA) have targeted as many as 285 million drawings and 500,000 technical publications for EDMICS storage and retrieval. Indexing of this data, which is now stored on paper or aperture cards, will be supported by mainframe computers. To get the records into EDMICS, users will choose from a range of scanners offered as part of the raster imaging system.

Because EDMICS is part of the DoD's program to transfer bid sets electronically to vendors for spare parts redesign and weapons procurements, the system can accommodate a variety of standard communications protocols. These open-systems capabilities include the Government Open Systems Interconnection Profile, TCP/IP, and X.25. EDMICS is also compatible with IBM Corp.'s Systems Network Architecture and DECnet.

### State and Local Activities

In July 1992, California enlisted Lockheed Information Management Services Co. to build a network that will help the state locate parents who are delinquent in their child support payments. The network, dubbed the Statewide Automated Child Support System, is expected to increase by \$135 million each year the money collected for child support. The long-term goal of the project is to recoup over \$3 billion in outstanding payments. The network will consist of minicomputers linked by DEC's DECnet architecture in all but one of California's 58 counties. It will also connect the counties with databases used by other California state agencies. The Automated Child Support System came about because of a federal mandate that requires all states to computerize their child support services by the end of 1995.

### Commercial Activities

On April 13, 1992, Lockheed and AT&T jointly announced the capability to offer motorists some of the advanced services envisioned by Intermodal Surface Transportation Efficiency Act of 1991. These services are lumped together in the category Intelligent Vehicle Highway Systems (IVHS) and

include things like automated electronic collection of tolls via credit card-sized "smart cards" mounted on cars, smart road signs, computers that monitor traffic and dispatch help in emergencies, and live images of the road ahead available to the driver on a video screen in the automobile.

AT&T will bring its expertise in computer processing, "smart card" technology, wireless/light-wave transmission of voice, data and video, and the design and management of communications networks to Lockheed contracts. Lockheed will add sophisticated systems integration skills, software capabilities, and an in-depth knowledge of the transportation marketplace. Both companies already have in place some IVHS systems. Lockheed has already installed the first electronic toll collection system in the United States. Lockheed operates the first automatic truck revenue collection and weigh-in-motion highway network, linking six states and British Columbia.

AT&T Bell Laboratories has developed an electronic toll collection system that uses smart cards—credit card-sized devices with embedded microelectronics. Lockheed Information Management Services (IMS) will perform the work for Lockheed Corporation. AT&T IVHS Communication Systems is headquartered in Bridgewater, NJ, and is a unit of AT&T.

In April 1991, Lockheed Missiles & Space Co. won a \$2.5 billion nongovernment contract to develop the Iridium Telecommunications System with Motorola. Iridium, which is named for the element with 77 electrons, is a proposed network of 77 satellites that would allow conversations between points anywhere on earth via hand-held phones. Iridium would employ small, inexpensive satellites in low orbits—413 miles rather than the usual 22,000 miles. The number of satellites in the system means that anyone using a hand-held phone would be accessible to any other given point on the planet at any time. According to one telecommunications industry analyst, personal communication networks (PCNs) should be in place at about the same time as Iridium. If so, hand-held telephones that could be used with the Iridium system might cost less than \$100, and the per-minute cost of using such devices would be comparable to use of contemporary pay phones.

In June 1991, Officials at Motorola Satellite Communications had confirmed the announcement by British Aerospace that it will join the international team supporting the Iridium system. Iridium is the revolutionary global personal communications program that combines Motorola's space technology with its terrestrial cellular expertise.

Using Low Earth Orbiting (LEO) satellites, Motorola plans to provide worldwide, portable hand-held, mobile and fixed telecommunications coverage. Current plans estimate the launching of the Iridium constellation of 77 satellites to begin in 1994.

Motorola Satellite Communications, Lockheed Commercial Space Co., and British Aerospace have signed a memo of understanding (MOU) under which the three participants will collaborate in undertaking the planning phase of the Iridium system.

The MOU calls for British Aerospace personnel to join the Motorola/Lockheed team currently at work on the system in Chandler, AZ.

During the planning phase, the three organizations will work to identify a range of areas for mutual participation. Motorola is one of the world's leading providers of electronic equipment, systems, components, and services for worldwide markets. Motorola Satellite Communications selected Lockheed Missiles & Space Co. (LMSC) to be its space segment partner for the Iridium program. The two companies have signed a letter of intent to develop a business arrangement and form an international industrial team. The announcement followed a seven-month selection process that began in July 1990 and involved 17 of the world's best known aerospace companies.

LMSC, headquartered in Sunnyvale, CA, is a major developer of space systems, missiles, and other high technology products. LMSC's production experience includes more than 350 LEO systems, making it a logical choice to cooperate in the development of Iridium, a telecommunications system of 77 satellites, which will be placed in near-polar orbital planes. LMSC has also demonstrated a capability for streamlined, rapid development of very complex systems through its "Skunk Works" manufacturing approach.

LMSC sent a senior design team to the Motorola Satellite Communications facility in Chandler, AZ, to jointly design the Iridium spacecraft and participate in the selection of the international industrial team to build and supply the various subsystems and components.

During the period covered by the letter of intent, Motorola and LMSC will work together to complete preliminary plans and formulate a formal business arrangement.

### 6. SI Organization

Systems Integration (SI) within Lockheed is conducted within three different organizations: Lockheed Integrated Solutions Co., Lockheed Information Management Services, and FORMTEK, Inc.

LISC made inroads into the civilian government integration market when it landed both NOAVA (Nationwide Office Automation contract for the VA) and a \$40 million pact with the Department of Health and Human Services' National Cancer Institute. These were its first large civilian

contracts since it decided to focus on such markets. In 1991, after missing on a couple of major procurements, Lockheed Corp. moved Lockheed Integrated Solutions' headquarters from Fairfax, VA, to Santa Clara, CA, to help reduce costs.

Originally, Lockheed Missiles & Space Co. had broken up its Control, Command, Communications, and Intelligence (C<sup>3</sup>I) division and has moved those groups to a new systems integration division targeting commercial and civil government opportunities. This new division, Lockheed Integrated Solutions Co., was to concentrate on image processing, a business in which integrators play a key role tying together hardware and software. The original C<sup>3</sup>I division was set up to pursue Department of Defense contracts. Lockheed Integrated Solutions consisted of three operating units: Pittsburgh-based FORMTEK Inc.; a geographic information systems unit in Fairfax, VA; and Santa Clara, CA-based Complex Systems Applications.

FORMTEK was restructured to streamline operations and focus greater attention on systems integration. The restructuring includes expanding the company's systems integration staff; consolidating management positions and field offices; and reducing the administrative, product development, marketing, and direct sales organizations.

FORMTEK is being redirected in order to respond more effectively to rapidly evolving market conditions. Over the past few years, as imaging technology has proven itself in pilot installations, INPUT has observed significant growth in the demand for solutions that cut across traditional operational boundaries and address the specific and often unique requirements of large engineering organizations.

INPUT expects the company's focus on open systems to work well in the government. Agencies do not want to be tied to a specific hardware, software, or communications technology vendor. FORMTEK is interested in going after business where agencies are moving to integrate electronic imaging systems with their existing systems.

FORMTEK offers total imaging systems, from input and capture, to information storage and management, to revision of that information. The hardware involved includes scanners, laser printers, plotters, PCs, workstations, and optical-storage devices. FORMTEK began its move toward system integration and the support of indirect distribution channels when it was acquired by Lockheed Co. in October 1989.

## 7. SI Business Objectives

The Defense budget concerns the Lockheed environment because 70% of Lockheed's sales are to the DoD. Lockheed feels that its programs will continue to receive broad support, although it does feel that some of its programs will be affected.



Lockheed depends on its fundamental strengths—premier technology; the ability to integrate large, complex programs; a broad set of high-priority programs; financial strengths; and a record of performance that has earned Lockheed its customers' trust—to differentiate itself from its competitors.

With defense, the strategy is to continue to focus on the core business and managing for improved profitability.

### **Nondefense Business**

Lockheed's 30% nondefense business includes NASA and other non-DoD government programs, along with international and commercial activities. NASA budgets are projected to increase modestly in the future, and as the number two NASA contractor, Lockheed can be expected to capitalize on emerging new opportunities with this agency.

The strategy in other nondefense areas is to selectively pursue opportunities where existing skills can be leveraged to move into new, but closely related markets. The efforts with Motorola on the Iridium communication system is an example of leveraging space systems skills to enter a new market.

Other initiatives are directed toward expanding business in commercial aircraft modification and maintenance, airport development and privatization, state and city services, and environmental remediation. The long-term goal is to achieve a 60/40 mix between defense and nondefense business without decreasing the level of defense activities.

### **8. SI Capabilities Evaluation**

SI is a business offering that provides a complete solution to an information system, networking, or automation requirements through the custom selection and implementation of a variety of information systems products and services. A systems integrator is responsible for the overall management of a SI contract and is the single point of contact and responsibility to the buyer for the delivery of he specified system function, on schedule and at the contract price.

For an engineering imaging solution to be successful and cost-effective it must

- Effectively replace or augment existing manual processes
- Easily fit into the present work environment, utilizing existing hardware, CAD systems, and digital drawing files
- Often be customized to specific user requirements

Few companies, even in the same field, handle documents on a day-to-day basis in exactly the same way. It is unrealistic to expect an organization to change existing procedures and methodologies to automate operations. Instead it should acquire a solution specially designed for its particular application. In keeping with FORMTEK's commitment to provide complete, long-term imaging solutions, FORMTEK's Systems Integration team develops customized solutions built around baseline FORMTEK products. FORMTEK refers to this as product-based systems integration.

A turnkey document management solution can involve a number of hardware platforms and software packages. All pieces of the total solution must be combined to ensure maximum payback in the shortest possible timeframe. An experienced product-based system integrator like FORMTEK will focus on the overall picture and handle all critical technical and administrative details of implementing a heterogeneous, turnkey imaging system. Following are some examples of the kinds of services FORMTEK has provided for its customers.

- Customization of the FORMTEK:SKETCH+ product to satisfy the U.S. Navy's EDMICS engineering drawing software requirements
- Development of customized document management systems with forms, indexes, and processes conforming to the user environment
- Document data bases for indexing all existing images, including raster, CAD, microfilm, and technical publication files
- Development of a large document faxing capability that allows users to send engineering drawings over standard communications lines
- Integration of specialized or existing scanners, plotters, and optical storage subsystems
- Development of custom image translators to convert CAD, text, and image files into a common format
- Development of native-language user interfaces and product modules
- Integration of FORMTEK products into a hybrid computing environment involving a mix of hardware, software, network, and database products

## 9. SI Strategic Alliances

FORMTEK has established several strategic partnerships with major international vendors. Through these alliances, expertise, resources and complementary technologies are combined to provide customers with complete solutions.



Computervision, a Prime Computer company, provides a suite of raster products for scanning, raster editing, and viewing based upon FORMTEK's unique technology. These products can be used in conjunction with Medusa, Calma DDM, and CADD5 4X—Computervision's CAD/CAM product lines. Elements of FORMTEK's raster editor are built into Medusa, CADD5 4X, and Calma DDM to create a hybrid raster/vector drafting tool.

GeoVision, a leading GIS (Geographic Information Systems) supplier, has also incorporated FORMTEK's raster technology into its product line. Along with the embedded raster mode, GeoVision will provide FORMTEK's scanning subsystems to its customers, which use these systems to manage all data associated with mapping, facilities management, and spatial analysis.

In addition, FORMTEK is an IBM Business Partner, participating as a Cooperative Software Program (CSP) Supplier in the U.S., and in the Vendor Logo Program in Europe. These relationships allow FORMTEK and IBM to integrate image and CAD data under IBM's CIM architecture, thereby improving productivity and product quality, while reducing product cycle time.

FORMTEK also works with large distributors throughout the world, including ARC CAD in Australia, Marubeni Electronics in Japan, and Soltec in Brazil.

Like other aerospace firms bidding on SI programs, LISC forms alliances based on the needs of the procurements. Lockheed IMS has established a relationship with AT&T for efforts based on the intelligent highway. The strategic alliances of FORMTEK are shown in Exhibit LOCKHEED-2

#### EXHIBIT LOCKHEED-2

### Strategic Alliances—FORMTEK

- Computervision
- GeoVision
- IBM
- PRC - EDMICS

## 10. SI Capabilities Summary

FORMTEK gives Lockheed the opportunity to apply SI to document management and engineering drawing systems. The rest of the SI capabilities of Lockheed are applied internally and are difficult to evaluate.

## 11. SI Marketing Strategy

INPUT expects FORMTEK and Lockheed IMS to continue as SI organizations. FORMTEK will continue to develop commercial opportunities for its products and use its SI skills to solve commercial problems. Lockheed IMS will continue to pursue state and local opportunities to apply its unique talents. Because LISC won two major contract awards, INPUT expects it to establish a new strategy for federal business in the fall of 1992.

## 12. SI Customer Base

FORMTEK systems are being used by engineers, draftsmen, and technical support personnel in large aerospace and discrete manufacturing firms such as Boeing, General Electric, Pratt & Whitney, Lockheed, NEC, Rockwell International, and U.S. Steel. Posters, draftsmen, estimators, and engineers use FORMTEK systems in major utilities such as Bell of Pennsylvania, The California Department of Water Resources, The Electricity Commission of New South Wales, and Pacific Bell.

FORMTEK software is also being used by the Navy and Defense Logistics Agency in the Engineering Data Management Information and Control Systems (EDMICS). The EDMICS system is a major element of the Department of Defense's Computer-Aided Acquisition and Logistics Support (CALS) program initiative. FORMTEK products comply with the U.S. Government National Institute of Standards and Technology (NIST) standards for raster data interchange among defense contractors, and departments and agencies of the federal government.

## 13. Summary and Future Directions

Lockheed's strategy is to expand into new business areas by boosting nondefense from 30% to 40% of revenue while holding the defense revenue steady.

Even though LISC has lost the last two of its major proposal efforts, INPUT has identified several areas where Lockheed has leveraged some recent successes.

FORMTEK has positioned Lockheed in the DoD CALS market by its participation in EDMICS. CALS will remain a major DoD industrial and aerospace initiative well into the next century.

LISC and FORMTEK have positioned Lockheed in the emerging market for aerospace contractors in state and local governments by winning contracts in three states to assist with child support collections, payments, and processing.

INPUT believes that with the contract for the Air Force's F-22, the first new air superiority fighter in more than 20 years and one of the largest military programs ever awarded, Lockheed will be tempted to return to its core business. With the potential billions of dollars represented by this aircraft award and the potential billions of dollars represented by the Iridium program, it will be difficult for Lockheed to focus on its information services and systems integration components.

Just as Lockheed has sold off information service subsidiaries such as Dialog Information Service, CADAM INC, and Metier, it could also sell off Lockheed IMS, CalComp, FORMTEK, and LISC and focus on its core business represented by the F-22 and the Iridium communications project.



## COMPANY PROFILE

---

### Martin Marietta

#### 1. Key SI Contacts

Martin Marietta Corp.  
6801 Rockledge Drive  
Bethesda, MD 20817  
(301) 897-6000

Martin Marietta Information Systems Company  
Gerald A. Zionit, Vice President  
7101 President's Drive  
Suite 300  
Orlando, FL 32809  
(407) 826-1700

Martin Marietta Air Traffic Systems  
Brian Etheridge  
475 School Street, SW  
Washington, DC 20024  
(202) 646-2028

Martin Marietta Technical Services, Inc.  
Gary Mann, Vice President  
6801 Rockledge Drive  
Bethesda, MD 20817  
(301) 897-6000

#### 2. Description of Principal Business

Martin Marietta Corporation is an aerospace, electronics, and information technology firm engaged in the creation and integration of systems and products in the fields of space, defense, communications, information management, energy, and materials. The corporation employs about 62,000 people in major groups and operations located throughout the U.S. and overseas. The Astronautics Group, headquartered in Denver, Colorado, develops and produces defense space and C<sup>4</sup>I systems, civil space and communications systems, strategic systems, and space launch vehicles. The Electronics, Information & Missiles Group, based in Orlando, Florida, develops and manufactures sophisticated air defense systems, airborne electro-optical navigation and targeting systems, missiles, precision-guided munitions, naval systems, and other high-technology defense systems. The group's information systems unit creates a variety of simulation, logistic support, and advanced defense and civil information systems.

Air Traffic Systems, in Washington, D.C., is the systems engineering and integration contractor for the Federal Aviation Administration's multiyear modernization of the nation's air transportation network. Technical Services, Incorporated, in Bethesda, Maryland, is a wholly owned subsidiary providing facilities and program management, systems development, installation, operations and maintenance, and hardware assembly. Advanced Development & Technology Operations, in San Diego, California, is an autonomous unit focused on identifying, developing and demonstrating innovative technology.

Martin Marietta Corporation reported net earnings of \$313.1 million on sales of \$6.1 billion in 1991. Earnings from operations reached a record \$537.5 million in 1991, an increase of more than 21% over the previous year. The year-end backlog of \$11 billion in firm orders again approached two times annual sales. 1991 was a very good year for Martin Marietta, despite severely reduced defense spending and lingering recession in the overall economy. Earnings per share were \$6.30 after a non-recurring charge of 78 cents per share for restructuring a non-core business unit that has had a negative effect on earnings in recent years.

As a leading defense contractor, Martin Marietta is well diversified in terms of programs and underlying technologies. Martin Marietta is well positioned to benefit from the Department of Defense's (DoD's) announced plan of emphasizing research and development. The corporation has been the DoD's number one contractor in this area for the past two years, remaining at the top of the industry in annual ratings for independent research and development and active in 17 of 21 critical defense technologies.

### **3. Company Competitive Position**

#### **a. Electronics, Information & Missiles Group**

Martin Marietta Electronics, Information & Missiles Group, headquartered in Orlando, Florida, is engaged in the design, development, engineering, and production of electronic systems for precision guidance and air defense programs; electro-optical target acquisition, designation, and navigation systems; missiles and missile launching systems; computer-based information systems for civil and military applications; simulation systems; automated equipment for high-speed mail sorting; and ordnance.

The Electronics, Information & Missiles Group comprises four companies: Electronic Systems, Missile Systems, Information Systems, and Martin Marietta Ordinance Systems, Inc. Martin Marietta Aero & Naval Systems, headquartered near Baltimore, Maryland; Martin Marietta Air Traffic Systems, headquartered in Washington, D.C.; and Martin Marietta

Technical Services, Inc. headquartered in Bethesda, Maryland, are included with the group for industry segment reporting purposes. The revenue from the Electronics, Information & Missiles Group was up 2% for 1991 to \$561 million.

#### **b. Information Systems**

During 1989, Martin Marietta Information Systems (MMIS) was awarded a contract from the U.S. Postal Service (USPS) for the production of 267 Model 775 Flats Sorting Machines. Their installation was completed by mid-1992. The machines are produced at Information Systems' Production, Assembly and Test Facility at Albuquerque, New Mexico, and are used to sort large, flat pieces of mail. During 1991, the USPS awarded Information Systems a new contract, called the "2+2 retrofit," which will require the company to redesign and reconfigure 523 machines that process large, flat pieces of mail. Information Systems also was awarded a related contract for production of 812 Flat Mail Bar Code Readers that locate and read postal bar codes on large, flat pieces of mail. Delivery of these units will begin in 1992.

Information Systems is pursuing other USPS programs intended to automate further the nation's mail-handling facilities. Information Systems designed and developed a Delivery Bar Code Sorter mail-handling system that sorts mail by zip code. The system successfully completed field testing during 1989, and in July 1990 the company received an order for 614 systems. The company was awarded an 11-month development contract to design an improved printer/label applicator for use by the USPS in computerized mail forwarding. Information Systems performs its contracts for the USPS through its Postal Services operating unit.

The company is the integration contractor for the Strategic Defense Initiative National Test Bed (NTB), a five-year \$567 million contract. As part of the Strategic Defense Initiative, the NTB tests and evaluates simulated strategic defense concepts, architectures, battle-management plans, and technologies that would not otherwise be feasible to test. The program, originally awarded in 1988 as a seven-year contract, is being restructured into a five-year contract with two one-year options. As part of this program, the company is developing the Strategic Defense Initiative National Test Facility at Falcon Air Force Station, Colorado.

Martin Marietta has 25 systems integration (SI) contracts completed or in process since 1990. The average value of a commercial SI contract is \$10,000 with the federal value 30 times as much. Martin Marietta expects the commercial value to decrease and the federal values to increase.

The company also provides data processing and SI services to other segments of the corporation (primarily the Astronautics Group and other units of the Electronics, Information & Missiles Group), which, in 1991, accounted for approximately 10% of the Electronics, Information & Missiles' business. The company operates three data centers that provide computing services to the corporation. Two of these data centers also provide computing services to commercial customers.

Although Martin Marietta Air Traffic Systems is a separate operation, its financial information and results are included with Electronics, Information & Missiles for segment reporting purposes. It reports directly to the corporation's Executive office.

Under a 10-year, \$900 million contract awarded in 1984, Martin Marietta Air Traffic Systems is providing systems engineering and integration services to the U.S. Federal Aviation Administration (FAA). These services are helping the FAA to implement its Capital Investment Plan, a plan for modernizing the nation's air traffic control system. The plan requires upgrading the FAA's computer, weather, navigation, and communications systems. During 1992, the FAA will seek bids for the recompetition of engineering, project management and implementation services in furtherance of its modernization program.

Under a contract awarded in 1988 and extending through January 1993, Martin Marietta Canada Ltd. is providing similar systems engineering and integration support to Transport Canada in its implementation of the Canadian Airspace System Plan for modernizing that nation's air traffic control system.

Under a contract with the DoD, the company provides engineering and integration services to the DoD for maintaining compatibility and interoperability between the military air traffic systems and the system being modernized under the FAA's Capital Investment Plan.

The company is committed to participating in the modernization of airspace systems both domestically and internationally. Thompson DSF awarded Martin Marietta a subcontract for systems engineering support in the initial phases of an effort to develop a U.K. air traffic control center.

#### **c. Martin Marietta Technical Services, Inc.**

Martin Marietta Technical Services, Inc. (MMTS), is a wholly owned subsidiary of the corporation. Although it is a separate operation, its financial information and results are included with Electronics, Information & Missiles for segment reporting purposes. Martin Marietta Technical Services, Inc. provides facilities and program management, systems development, installation, operations and maintenance, and hardware assembly for government and commercial customers.



Under a contract originally awarded in 1985 that extends until March 1993, the company operates and manages a data center for the County of Orange, California. The data center processes a variety of applications for the county's residents, including tax assessments, health and welfare benefits, county payroll, and legal records.

In 1988, MMTS was selected by the General Electric Company and approved by the Navy to be the dual manufacturing source (DMS) of the Consolidated Automated Support System (CASS). CASS is a completely automated, self-contained diagnostic unit for testing Navy electronic and avionics systems. The company is currently under a low-rate initial production contract to build 22 CASS units requiring delivery through February 1993. CASS units are being assembled in the corporation's new production facility at Americus, Georgia. A second low-rate production contract is expected to be awarded in 1992 for the delivery of 24 CASS units between June 1993 and May 1994.

In 1989, MMTS was awarded a two-year contract with three optional one-year extensions to supply software development and support services to the Social Security Administration's data processing operation in Baltimore, Maryland. The first option was exercised. The software will be used to support the issuance of Social Security cards, the maintenance of earning records, and the processing of benefits claims.

In September 1992, MMTS was awarded a \$302 million five-year contract to manage the EPA's National Data Processing Center and Communication Network. The facilities management will be primarily in North Carolina with additional support for EPA's New Support Computing Facility in Bay City, Michigan, and the Washington, D.C., information center.

Martin Marietta's business is highly competitive based on both price and technical capability, and involves rapidly advancing technologies. Opportunities are subject to many uncertainties including, but not limited to, those resulting from a re-examination of federal budget priorities, particularly the size and scope of the defense budget. Approximately 94% of the 1991 sales of these two groups was made to the U.S. government, either as a prime contractor as a subcontractor, principally to the DoD and NASA and additionally to the U.S. Department of Energy, the U.S. Department of Housing and Urban Development, and the U.S. Postal Service; thus sales and earnings are subject to the size and phasing of government programs in which Martin Marietta participates. Programs, including those under contract, are subject to periodic review in light of changes in government policies and requirements, availability of funds, and technical or schedule progress.

#### d. Business Environment

Current economic conditions in the U.S., coupled with recent world events that have lessened military threats world-wide, have added emphasis to a re-examination of federal budget priorities. These recent political and world events have added to the uncertainty surrounding the size and scope of the defense budget and added volatility to the business environment of the aerospace and defense industry. Although the precise effect of these developments on specific products and programs is not fully known at this time, the general market decline in the defense industry is expected to continue over the next few years. These events will continue to intensify the highly competitive defense and aerospace markets.

Martin Marietta's broad program mix and emphasis on high-priority systems lessen the corporation's exposure to major federal budget reductions or fluctuations. However, the U.S. administration's current defense budget reduction plan includes cancellation of programs that will have a direct impact on the corporation. Most significant are the proposed cancellations of the mobile Air Defense/Anti-Tank System (ADATS) program and the Small Intercontinental Ballistic Missile. Martin Marietta management does not believe there is a high probability that any of its other major programs will be cancelled. There is, however, the possibility that funding limitation could result in a stretch-out or cutback in existing or emerging programs.

#### 4. Markets Served

Martin Marietta's Information Systems Group targets functional markets based on the selection criteria shown in Exhibit MM-1.

EXHIBIT MM-1

#### Target Market Selection Criteria

- Growth potential
- Acceptable return on investment
- Technical content
- Competitive environment

## 5. Recent Events

Under a 12-year, \$525 million U.S. Department of Housing and Urban Development (HUD) contract awarded in 1990, the company is modernizing HUD's data processing systems. The HUD Integrated Information Processing Services (HIIPS) contract requires Information Systems, as the principal contractor, to design, install, test, and maintain HUD's data processing systems and its nationwide telecommunications network. The contract is to upgrade and consolidate the system into a single integrated operating network. Most of the work will be done at the company's data processing center in Lanham, Maryland.

In 1990, the company won a \$70 million software development contract to modernize the Air Force Logistics Command's equipment management system. The Air Force Equipment Management System (AFEMS), will serve all Air Force, Air National Guard, and Air Force Reserve locations. The company has established a development and production facility next to Wright-Patterson Air Force Base, Ohio, and will establish a secondary facility at Robins Air Force Base, Georgia. During 1991, the AFEMS proceeded to the demonstration stage.

The system tracks all Air Force equipment except weapons, consumables, and fuel and supports 3,000 logistics personnel in managing a \$25 billion inventory of approximately 250,000 items. Estimates by the Air Force put savings to the service of \$400 million annually from the improved system.

In 1990, Martin Marietta combined together four informational systems group units—Civil Information Systems, Internal Information Systems, Postal Information Systems, and Simulations Systems—called that collective group Martin Marietta Information Systems (MMIS), and then put Information Systems into the Electronics, Information & Missiles Group.

Most of MMIS's noncaptive revenue is derived from large systems integration projects. This activity also provides systems operation and professional services.

A major contract, Housing and Urban Development Department's Integrated Information Processing Services (HIIPS) contract, was won in November 1990. Martin Marietta is the systems integrator and will oversee up to 40 contracts that will be folded into the HIIPS umbrella contract. HUD employees and other contractors will handle application systems development. HIIPS is designed to integrate all of HUD's computer systems and LANs at 81 field and regional offices and at headquarters. The HUD Integrated Network (HINET) will replace HUD's Computerized Homes Underwriting Management System (CHUMS) and HUDnet, which handles everything not processed on the CHUMS network. CHUMS is HUD's largest application. The network handles up to

350,000 transactions a day from all HUD offices. To manage HIIPS, Martin Marietta won the contract to install the HINET, which will let the company pinpoint problems down to a CPU, network node, or even a microcomputer.

In September, 1992, MMTS was awarded the \$302 million five-year contract to manage data processing centers for the EPA.

## 6. SI Organization

Martin Marietta has been in the SI business for 20 years. Responsibilities required to manage and execute an SI contract are matrixed. Exhibit MM-2 shows Martin Marietta's approach to federal SI activities.

EXHIBIT MM-2

### Martin Marietta's Federal SI Process

Responsibilities	Approach
Strategy and long range planning	C
Marketing and promotion	B
Account management/sale	B
Contract/renew/approval	B
Product management/control	C
Implementation/development	C
Hardware/software acquisition	B
Systems operation	B

C = centralized D = decentralized B = both

Martin Marietta estimates that it generated \$50 million in commercial SI revenue and \$600 million in federal SI revenue in 1991. It expects the federal revenue to grow at an average annual rate of 6% over the next five years. To generate this revenue Martin Marietta has 300 full-time commercial SI staff and 1,000 full-time federal SI staff. MMIS can temporarily augment its commercial SI staff by 325 and its federal SI staff by 1,200. Exhibit MM-3 shows the percentage of the total average staff associated with each category.

## EXHIBIT MM-3

**MMIS Staffing**

Capability	Percentage of Staff
Management strategy and planning	5
Legal support/contract administration	2
Project management	10
System development/implementation	30
Hardware/software evaluation/acquisition	10
Hardware engineering	40
Sales	3

Martin Marietta has determined that 70% of its federal SI business comes from new accounts while 70% of its current commercial SI business comes from its existing client base. The company forecasts that margins are increasing for all sources of SI business. Ninety percent of the revenue comes from prime contracts with only 10% from subcontracting.

**7. SI Business Objectives**

Martin Marietta's "Peace Dividend Strategy" reinforces the corporation's vital role in national defense while expanding its nondefense business base and enhancing shareholder value.

The plan, evolved over the past two years, comprises three elements. First, it will take advantage of defense industry consolidation trends by capitalizing on the corporation's technological competencies to expand market share in the key areas of space and electronics and by making opportunistic defense acquisitions. Second, it will continue the aggressive expansion of the corporation's nondefense market penetration, both in government markets—such as DOE, HUD, and the postal system—and by participation in the rebuilding of our nation's infrastructure. Third, this strategy employs the company's cash generation capabilities to enhance shareholder value.

Martin Marietta is well positioned to benefit from the DoD's announced plan of emphasizing research and development. Currently, major contracts are in progress for the Department of Energy, the Department of Housing and Urban Development, the U.S. Postal Service, the Social Security Administration, and others. Martin Marietta has been a major contractor for NASA since the earliest years of the U.S. space program.

The corporation's commercial and civil government business now accounts for about 28% of earnings. Over the past three years, it has signed more than \$6 billion of new business.

## **8. SI Capabilities Evaluation**

SI is a business offering that provides a complete solution to an information systems, networking, or automation requirements through the custom selection and implementation of a variety of information systems products and services. A systems integrator is responsible for the management of an SI contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contract price.

There are some primary capabilities required to deliver SI projects. Exhibit MM-4 indicates if the capabilities exist in-house, the strength of Martin Marietta Information System's Company (ISC) with regard to that capability, and an indication as to whether or not alliances are used.

## EXHIBIT MM-4

**Martin Marietta ISC's SI Capabilities**

Capabilities	Exists Y/N	Level of Strength	Alliance Y/N
Business consulting	Y	M	Y
Design methodology	Y	H	N
Design/integration	Y	H	N
Project management	Y	H	N
Software development	Y	M	Y
Education/training/documentation	Y	M	Y
Packaged application software	Y	M	Y
Packaged systems software	Y	M	Y
Standard computer hardware	N	-	Y
Custom computer hardware	N	-	Y
Communication hardware	Y	M	Y
Network management/operations	Y	H	Y
Service & report	Y	L	Y
Software maintenance	Y	H	Y

\*L = Low M = Medium H = High

**9. SI Strategic Alliances**

As shown in Exhibit MM-5, Martin Marietta ISC has strengths in most capabilities required for SI success. In these areas where the company is lacking, it is supplemented with alliances. The company has a formal program with regard to alliances. Alliances developed on a contract-by-contract basis. The company has the basic philosophy of winning by developing alliances based on the requirements of the proposed program and the competition. In Exhibit MM-5 some of the company's SI alliances are identified.

## EXHIBIT MM-5

**Martin Marietta Alliances**

Company	Purpose
REI	Form-handling scanners
IBM	Hardware
BBN	Computer image generation
MRJ	Parallel processing methodology

**10. SI Capabilities Summary**

Martin Marietta ISC brings products and capabilities to the SI market place. This permits it to gain leverage over the competition. CASE and design methodology is available for I-CASE project. The company offers technology for personnel identification by matching fingerprints, DNA, and voice patterns. The company provides information handling technology for advanced image processing, large data bases, and large distributed networks.

Like other aerospace firms, INPUT feels that Martin Marietta ISC will be able to pursue SI opportunities as long as the aerospace business remains strong.

**11. SI Marketing Strategy**

MMIS participates in the SI marketplace because of the primary business objectives of revenue generation and responding to customer demands. Secondary business objectives are account base control, follow-on sales from a facility management contract, and strengthened MMIS business.

Martin Marietta promotes its SI services by using advertising in trade and industry publications, with low results; client referrals, with better results; and personal contacts, with the best results.

Martin Marietta's primary competitors in the SI business are shown in Exhibit MM-6.



## EXHIBIT MM-6

**Martin Marietta's SI Competitors**

Commercial	Federal
IBM	IBM
EDS	EDS
DEC	Unisys
	TRW
	DEC

Federal contracts are generated by responding to Request for Proposals (RFPs) 60% of the time; by leveraging clients 20% of the time; and by generating requirements 20% of the time. In contrast, commercial contracts are generated by leveraging clients 60% of the time; by responding to RFPs 20% of the time; and by generating requirements 20% of the time.

**12. SI Customer Base**

Exhibit MM-7 shows five major clients with which Martin Marietta ISC has developed major SI products.

## EXHIBIT MM-7

**Martin Marietta ISC's Major SI Products**

Customer	Programs
SDIO	National Test Bed
USAF-TACCSF	Air Defense Simulation System
HUD-HIIPS	Data Processing & Networking
EPA	Data Processing, Networking & Super Computers
USPS	Mail Handling Automation

### 13. Summary and Future Directions

The corporation's backlog of undelivered orders was \$11.0 billion at December 31, 1991, compared with \$12.0 billion at December 31, 1990, and \$13.4 billion the year before. Approximately 42% of the undelivered orders at December 31, 1991, are expected to be filled within one year.

Reported backlog at December 31, 1991, does not include the potential effects of any program cancellations. The U.S. administration's current budget plan would result in a backlog reduction of less than 5%. Additionally, reported backlog does not include approximately \$2.4 billion of negotiated and priced, but unexercised, production options for certain of the corporation's major aero structure contracts and electronics, information, and missile programs, including the Advanced Tactical Air Reconnaissance System, Department of Housing and Urban Development Integrated Information Processing Service, and Optimized Hellfire and Javelin programs. The exercise of these options is at the discretion of the customer and, in the case of U.S. government contracts, depends on future government funding.

INPUT expects Martin Marietta to remain competitive in the SI marketplace as long as Martin Marietta remains competitive in the aerospace business, but there is no way for most aerospace firms to escape future downsizing. The strains in the aerospace business are evident when within 30 days of winning a \$302 million contract to manage the EPA National Data Processing Center and Communications Network, Martin Marietta announces that 300 jobs will be eliminated in MMIS by the end of 1992.

## COMPANY PROFILE

---

**McDonnell Douglas  
Systems Integration  
Company****1. Key SI Contact**

Mr. Mark Kuhlmann  
President and General Manager  
McDonnell Douglas Systems Integration Company  
P.O. Box 516, Mail Code 3061121  
St. Louis, MO 63166

**2. Description of Principal Business**

McDonnell Douglas Systems Integration Company is the remaining U.S.-based information systems business of McDonnell Douglas Corporation. McDonnell Douglas Information Systems Company was officially dissolved January 1, 1990 and several of its diverse units were divested, put up for sale, or are in the process of being spun off. See Exhibit MCD-1.

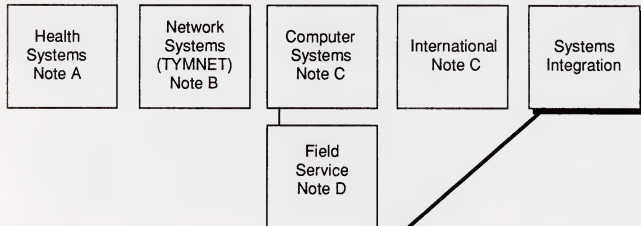
The Systems Integration Company is now a more focused business, primarily offering engineering-based products and services to manufacturing, telecommunications, state and local government, insurance, federal government, computer-aided software engineering, remote computing, and built environment technologies (architects, engineers and constructors, and infrastructure life cycle management).

McDonnell Douglas Information Systems Company at its peak had over \$1 billion in revenues and about 10,000 employees. In 1989, the Systems Integration Company will have revenues of about \$300 million with over 2,000 employees. After having been consistently unprofitable over six years, the Information Systems Company became profitable in the first half of 1989. About 70% of the Systems Integration Company's 1989 revenues are a result of SI activities and are divided between the commercial and federal markets, as shown in Exhibit MCD-2.

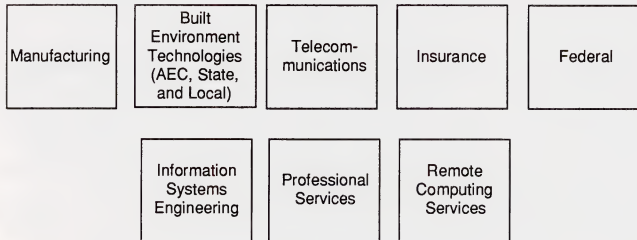
## EXHIBIT MCD-1

**McDonnell Douglas Information Systems Company  
Restructuring**

Information Systems Company  
Beginning of 1989



Systems Integration Company  
Beginning of 1990



- A. Divested to American Express (3/89)
- B. Divested to British Telecom (11/89)
- C. Combined to become a U. K.-based company (7/89)
- D. To be divested

## EXHIBIT MCD-2

**McDonnell Douglas  
Information Systems Company  
1989 Systems Integration Revenues**

Business Component	\$ Millions
Federal	10
Commercial	200

### 3. Competitive Position

The Systems Integration Company's strengths are based on its ability to capitalize on McDonnell Douglas Corporation's skills and experience in engineering and manufacturing, as well as its long-term relationships with a number of key accounts in its chosen markets. The Systems Integration Company should be in a better competitive position now that McDonnell Douglas' information services offerings have been pared down to a more focused set of products and markets.

The restructuring of the Systems Integration Company may cause some uncertainty in the short run, as a direct result of the reorganizations that have given it birth, as well as the necessity that the marketplace understand the capabilities of the new McDonnell Douglas entity.

### 4. Markets Served

The Systems Integration Company serves the following primary markets:

- Discrete manufacturing (with focus on aerospace, automotive)
- The architects, engineers and constructors (AEC) market, and the infrastructure market in state and local government, served by the Built Environment Technologies Division.
- Telecommunications companies
- Insurance companies (primarily automated claims processing for health, property/casualty, and reinsurance)
- Federal government
- System development organizations (for CASE methodology and tools)

- Professional services clients (for contract programming services)
- Remote computing customers (including systems operations)

## 5. Recent Events

By far the most important set of recent events has been the exit of McDonnell Douglas from much of the information services business, as described in Section 2. The result has been a much smaller and more focused organization.

## 6. SI Organization

The McDonnell Douglas Systems Integration Company is organized into vertical and cross-industry profit centers, as shown in Exhibit MCD-3.

EXHIBIT MCD-3

McDonnell Douglas Systems Integration Company Profit Centers	
Vertical Industries	Cross-Industry
<ul style="list-style-type: none"><li>• Manufacturing</li><li>• Telecommunications</li><li>• Insurance</li><li>• Federal</li><li>• Architects, Engineers, and Constructors and State and Local Government Infrastructure Management</li></ul>	<ul style="list-style-type: none"><li>• Information Systems Engineering (CASE)</li><li>• Professional Services</li><li>• Remote Computing Services</li></ul>

The cross-industry units' purpose is to support the vertical market units. However, they also provide direct services to customers:

- *Information Systems Engineering* sells CASE methodologies, tools, and training.
- *Professional Services* supplies contract programming, both through projects of other Systems Integration Company divisions and directly to commercial customers.

- *Remote Computer Services* receives revenue from provides remote application processing or systems operations support, a total information service for recently acquired or divested organizations while they are in transition and often for extended periods.

## 7. SI Business Objectives

The Systems Integration Company's market objective is to identify and satisfy the needs of customers who require complex, often technically-oriented information systems in areas of the company's expertise. The Systems Integration Company's internal objective is to perform these tasks profitably. Profitability is a key objective, given McDonnell Douglas Information Systems' history of losses.

## 8. Internal SI Capabilities Evaluation

### a. Business Consulting

The Systems Integration Company offers specialized technical business consulting as the front-end to its design and implementation tasks, which are the core of its offerings.

### b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation

The Systems Integration Company is very strong in this area because of its STRADIS and ProKit\* WORKBENCH CASE products and related services. These are used to support Systems Integration Company projects and are sold commercially (see Section 6).

### c. Packaged Application Software

The Systems Integration Company offers the highly regarded UNIGRAPHICS family of interactive, three-dimensional CAD/CAM software. Applications include solid modeling, sheet metal fabrication, printed circuit board design, finite element modeling, mechanism linkage design, graphics machining, simulation, robotics, plant communications systems, numerical control tape preparation, and quality assurance.

UNIGRAPHICS runs on DEC, Data General, Hewlett-Packard (HP), Apollo, and SUN platforms.

The Systems Integration Company also offers the Graphics Design System (GDS) family of software that serves as the core of its AEC and infrastructure management systems offerings for state and local governments as well as its network engineering offerings for telecommunications.

#### **d. Packaged Systems Software**

The Systems Integration Company does not offer systems software as such, outside of its CASE products.

#### **e. Standard Computer Hardware**

The Systems Integration Company's does not develop or manufacture computer equipment. Its core programs support a range of standard computer hardware like DEC, IBM, and other widely used equipment to satisfy its customers' requirements. UNIGRAPHICS supports most of the popular CAD/CAM platforms for the same reason (see Section 9).

#### **f. Custom Computer Hardware**

The Systems Integration Company does not provide custom computer hardware.

#### **g. Network Management and Operations**

The Systems Integration Company has not been active on a large scale in network management and operations since the sale of its TYMNET division. The Systems Integration Company is indirectly involved in networking through its work for telephone companies designing systems to support network engineering.

#### **h. Service and Repair**

After the sale of its field service business, McDonnell Douglas will rely on continuing relationships and alliances for support in this area.

#### **i. Software Maintenance**

The Systems Integration Company maintains its own software products and offers maintenance of its customized offerings.

#### **9. SI Strategic Alliances**

The Systems Integration Company has long-term marketing arrangements with most major hardware vendors (e.g., DEC, IBM, HP/Apollo, SUN), as well as selected software vendors of generalized products, such as ORACLE. The Systems Integration Company will team on bids with hardware vendors, accounting firms, and other systems integrators when required. The Systems Integration Company will subcontract where specialized skills are required. Since 1988, the Systems Integration Company has been a preferred vendor of General Motors/EDS, working to standardize CAD/CAM systems within GM.



## 10. SI Systems Capabilities

The Systems Integration Company's core strength is its ability to develop engineering-rich, complex systems. Examples of its capabilities include:

- The UNIGRAPHICS advanced CAD/CAM product
- GDS, the Systems Integration Company's base product for managing physical infrastructure (including geographic information systems)
- The STRADIS and ProKit\* WORKBENCH family of CASE methodology and tools
- Insurance core applications in automated claims handling and reinsurance
- Telecommunications core applications in network engineering and asset management, customer services/network operations, and administrative information systems

## 11. Marketing Strategy

The Systems Integration Company's emerging strategy is to tailor solutions for targeted niches in partnership with clients to whom it can bring proven core products and business understanding. Target niches include:

- Manufacturing companies
- AEC and public sector units with infrastructure (GIS) systems needs (e.g., transportation and environmental agencies)
- Telephone companies
- Insurance companies
- Federal customers

## 12. SI Customer Base

The Systems Integration Company serves over 2,000 customers with its products and services. Specific SI projects undertaken since the beginning of 1988 include three for the federal government and about 15 for nonfederal customers. Typical federal projects range from \$5-10 million.

Exhibit MCD-4 shows selected recent SI projects undertaken by the Systems Integration Company.

EXHIBIT MCD-4

### **Representative McDonnell Douglas Systems Integration Company Projects**

- Telecommunications Engineering and Asset Management System
  - Pacific Telesis
  - Southwestern Bell
- CAD/CAM integration with manufacturing systems
  - Kodak
- Outside Plant Records Integration
  - Bell Atlantic
- Central Artery Project—Highway/Tunnel Alignment Engineering Design
  - Massachusetts Department of Public Works
- Waste Water Treatment Facility for Boston Harbor
  - Massachusetts Water Resources Authority
- Program Administration and Execution System (PAX)
  - U.S. Army Corps of Engineers
- State Environment Agency Office Integration
  - Commonwealth of Massachusetts

### **13. Summary and Future Direction**

The Systems Integration Company is, in a sense, a return to McDonnell Douglas' roots. INPUT expects that the Systems Integration Company will become even more focused as it builds expertise and visibility in a series of subniches, and should be an increasingly formidable competitor in its areas of focus in the future.

## COMPANY PROFILE

---

NCR

### 1. Key SI Contacts

Paul H. Thurman  
Assistant Vice President  
Customer Services Division  
Systems Integration and Support  
1334 South Patterson Boulevard, USG-2  
Dayton, OH 45479

### 2. Description of Principal Business

NCR Corporation and its subsidiaries develop, manufacture, market, install, and service business information processing systems for world-wide markets. NCR is the best-known supplier of accounting and computing equipment to banks and financial organizations. NCR offers a wide range of equipment—from check sorters to computer mainframes and related banking industry software. NCR also has had a long and strong relationship with the retail distribution industry, where it is well known for point-of-sale and merchandising systems.

As a new entrant into the SI marketplace, NCR is reluctant to disclose any data on its SI revenues.

### 3. Competitive Position

NCR, in its role as a proprietary equipment and software vendor, has been selling solutions to business organizations for many years. NCR's Systems Integration and Support unit, however, has been in the commercial SI business for only three years; it has been active in the federal SI market for only one year. As a customer-oriented company offering total solutions and vertical-industry expertise to its customers, the shift to SI services is a natural response to a changing market.

NCR brings to its SI business time-tested expertise in its vertical markets. In addition, it has adopted the following strategy for promoting its new open systems/interconnectivity stance:

- Use of CASE/design methodology as a systems engineering discipline in applications development
- Promotion and use of industry standards in the development of industry-specific software
- Promotion of cooperative processes in the distributed/multiuser processing environment

- Adopting UNIX and DOS environment standards using IBM microchannel work platforms
- Promoting the use of NCR corporate project management capabilities
- Promoting the use of network management products such as ONE and Network Manager

By the above strategy, NCR positions itself as an integrator of disparate systems in all types of projects.

One weakness that NCR may have is that customers may perceive a lack of expertise outside of the financial and retail vertical industries. A few well-chosen successes that clearly show NCR's mastery of the technologies involved above should quickly dispel any doubts about NCR's capabilities.

#### 4. Markets Served

NCR's SI efforts are aimed primarily at the federal, state, and local governments, and at the following vertical markets:

- Retail
- Financial
- Manufacturing
- Health

NCR currently markets its SI services primarily to industry-focused (i.e., vertical market) clients.

As an equipment manufacturer, NCR formerly marketed its own brand of equipment as the most desirable solution to a client's needs; NCR, however, now presents itself as an open systems solutions vendor, specializing in the integration of systems that operate in multivendor environments. Thus, in its SI pursuits, NCR has become a total service provider.

NCR selects its market targets using the following criteria:

- Value of project
- Strategic direction
- Account control
- NCR's expertise in required area(s)

## 5. Recent Events

NCR Corporation has traditionally focused its efforts in the finance and retail industries; these industries have historically been very discreet about pursuing consulting assistance. Also, NCR, as an SI services vendor, has a very short and unpublicized history. INPUT has no specific examples of NCR's success as an SI services vendor.

Recent reports in the public press have suggested that NCR and AT&T may be pursuing some form of alliance, ranging from outright acquisition by AT&T to a joint marketing arrangement. (AT&T has offered to acquire NCR for \$6 billion.) At this time, it is not clear what will result. What is clear, however, is that NCR's customer base and services strengths coupled with AT&T's telecommunications/network expertise and financial strength would result in a major contender. It should be noted that NCR and AT&T are both committed to open/portable systems and that both companies have something to give and something to gain from any joint working arrangement.

## 6. SI Organization

NCR's Systems Integration and Support organization is an independent division of NCR. Like most SI organizations, NCR uses a matrixed management style that permits some facets of its management to be centrally controlled and other facets to be locally (i.e., decentralized) controlled. Exhibit NCR-1 shows how NCR makes use of centralized/decentralized management in the listed areas.

EXHIBIT NCR-1

### Centralized versus Decentralized Management

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	C
Marketing and promotion	C	C
Account management/sales	D	D
Contract review/approval	C	C
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	C	C

(C = Centralized, D = Decentralized)

NCR admits to about ten times more core staff (90) in its commercial SI efforts than in its federal SI efforts (10). In addition, it uses its field organization to supplement its core staff.

NCR chose not to disclose any detailed information about its SI organization, except for noting that Paul Thurman (head of Systems Integration and Support) reports to Gary Burnett, Vice President, Customer Services Division.

## **7. SI Business Objectives**

NCR is pursuing SI work as a natural consequence of its customer orientation—it sees provision of “thought leadership” and follow-on hardware/software sales, as well as strengthening of its non-SI business and responding to its customers’ demands, as primary motivators.

## **8. SI Capabilities Evaluation**

NCR offers a complete range of SI services. NCR offers every service identified by INPUT as necessary for a successful SI services vendor. In some cases, NCR uses an alliance to fill in for a missing capability; in other cases, an alliance strengthens NCR’s existing capability. As shown in Exhibit NCR-2, NCR has rated its in-house SI capabilities very conservatively.

Well-known and highly respected in financial and retail/distribution organizations but relatively unknown outside its usual markets, NCR’s Systems Integration and Support unit presents to its SI clients the following benefits:

- NCR offers a core group of experienced project managers
- NCR provides excellent technology knowledge
- NCR’s services require low financial risk
- NCR is an open systems vendor—its products and services are geared toward solving the problems of interoperability in a multivendor computer and network operating environment
- NCR is a total service provider

Two of NCR’s greatest strengths are its depth of expertise in the core areas of software design and development and project management, and its breadth of alliances to fill out and strengthen its capabilities in other areas, so that NCR can properly offer all required SI services.

## EXHIBIT NCR-2

**NCR's SI Capabilities Ratings**

Capability	Exists (Yes/No)	Strength	Alliance (Yes/No)
Business consulting	Yes	Low	Yes
Design methodology	Yes	Medium	No
Design/Integration	Yes	Medium	No
Project management	Yes	High	No
Software development	Yes	Medium	Yes
Education/Training/ Documentation	Yes	High	Yes
Packaged applications software	No	—	Yes
Packaged systems software	Yes	Medium	Yes
Standard computer hardware	Yes	High	Yes
Custom computer hardware	No	—	Yes
Communications hardware	Yes	Medium	Yes
Network management/ operations	No	—	Yes
Service and repair	Yes	High	Yes
Software maintenance	Yes	High	Yes

## 9. SI Strategic Alliances

NCR uses both long-term and contract-by-contract agreements to augment its products and services offerings. The Systems Integration and Support organization uses long-term or contract-by-contract agreements to make available specific hardware or software products or services that NCR does not produce, to better answer a specific client's requirements. In this way NCR can perform as a total system solutions vendor.

NCR declined to identify any of its strategic alliances. It remains to be seen whether anything will result from the interest in NCR shown by AT&T.

## 10. SI Capabilities Summary

NCR offers all the capabilities required to compete in the SI market place.

Core area (software development/implementation and project management) expertise is one advantage held by NCR; another is depth of experience in the financial and retail distribution industries. INPUT believes that, used properly, NCR's alliances could make NCR a leader in the SI marketplace within a few years.

Other strengths grow out of NCR's position as an open systems vendor. By promoting the use of industry standards (such as UNIX and microchannel-based workstations), NCR is seen as a contributor to the solution of problems with incompatible systems that must be made to interact. NCR's network management capabilities will clearly be necessary to support the increasingly connected information systems marketplace.

One weakness in NCR is a perceived lack of credibility outside its former market niches. INPUT believes that, in the short term, NCR would benefit from well-publicized teaming arrangements with larger and better-known SI services vendors whose successes would give NCR much-needed visibility in the broader SI market place.

Exhibit NCR-3 summarizes INPUT's evaluation of NCR's SI capabilities.



## EXHIBIT NCR-3

**INPUT's Evaluation of NCR's SI Capabilities**

Strengths	Weaknesses
NCR's expertise in financial and retail organizations	NCR's unfamiliarity with other vertical markets
NCR is an open systems vendor	
NCR's broad array of capabilities gained through alliances	
NCR's core area expertise	

**11. SI Marketing Strategy**

NCR's marketing strategy is highly focused on the financial services (banking and related) and retail and wholesale distribution industries. Although NCR has limited the scope of its marketing, it has shown itself to be interested in supporting each of its clients for the long haul, as evidenced by its emphasis on strong client relationships. INPUT believes that NCR has particularly strong capabilities in the financial services and retail industries that give NCR a well-defined advantage in these markets.

- Competitors. NCR declined to identify its competitors as a matter of policy.
- Positioning. As a computer manufacturer, NCR is well-positioned as a leading supplier of equipment and software to the banking and distribution industries. As a systems integrator, NCR—through its strategic alliances—can reinforce its role as a one-stop source of fulfillment of a client's needs. NCR has dropped its former proprietary systems architecture in favor of an open systems architecture.
- Promotion. INPUT notes that NCR makes very little use of common promotion methods, except for: public seminars, advertising (general business publications), and word-of-mouth/client referrals. NCR rates all these methods as having low effectiveness. Almost uniquely, NCR noted that 100% of its federal SI business results from responses to federal requests for proposals. Seventy-five percent of its commercial SI business is gained similarly; 25% comes from existing customers.

Although NCR declined to disclose its total SI revenues or commercial/federal breakouts, NCR did disclose the following average mix of values derived from commercial contracts only:

- |                         |     |
|-------------------------|-----|
| • Equipment             | 60% |
| • Packaged software     | 25% |
| • Professional services | 15% |

## **12. SI Customer Base**

NCR declined to disclose any information about its customer base and, thus, about its successful SI projects; however, NCR is an acknowledged leader in providing accounting and computing equipment to the banking and finance and retail distribution industries.

## **13. Summary and Future Directions**

NCR's strengths are its expertise in meeting the needs of the financial services and retail vertical industries, its emphasis on client relationships, its support for open systems, and the breadth of its capabilities supported by strategic alliances. Also, NCR has a large customer base in the financial services and retail industries.

Regardless of the outcome, NCR's pursuit by AT&T can only enhance its credibility in the broader SI marketplace.

NCR will remain a viable contender in its chosen market niches. INPUT expects NCR to broaden its markets to include all its target industry groups.

## COMPANY PROFILE

### NYNEX Information Solutions Group

#### 1. Key SI Contacts

A. Theodore Engkvist  
President  
NYNEX Information Systems Group  
4 West Red Oak Lane  
White Plains, NY 10604

Dr. Gad J. Selig  
Vice President & General Manager  
NYNEX Information Systems Group  
4 West Red Oak Lane  
White Plains, NY 10604

#### 2. Description of Principal Business

NYNEX—a combination of the former New York Telephone and New England Telephone companies—came into being as a result of the break-up of the Bell system in 1984. In common with the other regional Bell operating companies (RBOCs), NYNEX believed that in the long term it could not prosper offering only traditional, regulated telephone service.

One of NYNEX's strategic decisions was to enter the information services and software business. In 1987, NYNEX created the Information Solutions Group (ISG). One segment of ISG offers products and services developed internally by NYNEX constituents: NYNEX Computer Services Division and the NYNEX Development Company.

However, the greater part of ISG has been created via acquisition. Its major acquisitions include:

- AGS Computers (1988)
- The BIS Group (1986)
- Telco Research Corporation (1985)
- The Data Group (1985)

Section 6, below, shows the current organizational structure of NYNEX ISG units.

The different ISG business units provide NYNEX an opportunity to offer a wide range of SI services to several key vertical markets in both the U.S. and Europe.

ISG has 5,500 employees, and INPUT estimates that 1989 revenue for current ISG units was over \$500 million. Only \$100 million of this revenue is SI revenue (see Exhibit NYN-1); however, the majority of ISG products and services can potentially be mobilized for SI projects.

EXHIBIT NYN-1

<b>NYNEX</b> <b>1989 Systems Integration Revenues</b>	
Business Component	\$ Millions
Federal	10
Commercial	90

### 3. Competitive Position

Many of NYNEX ISG's strengths flow directly and indirectly from the fact that its parent is NYNEX. NYNEX has adopted a long-term strategy to become a dominant player in the information and communications products and services marketplace. Some of NYNEX ISG's strengths are listed below:

- Because this is a strategic business area for its parent, ISG has received (and will, no doubt, continue to receive) a significant level of investment for both internal development and for acquisitions. This does not mean that ISG is not viewed as a commercial, profit-making undertaking. However, the long-term positioning of ISG will not necessarily be sacrificed to quarter-to-quarter performance targets; the pressure for short-range performance is a problem experienced by some of NYNEX's public company competitors.
- The AGS acquisition brought bulk to ISG, including offices, contracts, and professional resources. It was a similar type of thinking that, in part, prompted IBM to make its 1989 investment in Computer Task Group, one of AGS's competitors.

- ISG is able to offer a mosaic of key products and services to key business sectors:
  - The financial services sector (banking and securities) through BIS, DISC, Inc. and Vista Concepts, Inc.
  - The telecommunications sector through Telco Research, AGS, and NYNEX Development.
- NYNEX's Complex Systems Integration Group (CSIG) contracts and mobilizes NYNEX ISG resources and directs these resources to client needs and develops new systems and network integration platforms.
- NYNEX's CSIG group is well-positioned to focus its SI strategies on the growing number of network integration opportunities and is doing so.

NYNEX ISG has weaknesses; these are intertwined with—in fact, almost mirror images of—its strengths:

- Its parent, NYNEX, is still legally constrained from offering several products and services that would, according to current legal doctrine, take unfair advantage of NYNEX's position as monopoly provider of communications services. The two areas in which constraints most affect NYNEX's position as a systems integrator in the U.S. are:
  - Manufacturing communications or computer hardware
  - Offering on-line remote processing of customers' data

These constraints have only been a minor hindrance so far. In the longer run, these barriers could create increasing problems if they remained in place; however, one school of thought believes that these legal prohibitions will be reduced or eliminated in the next few years. Since this issue is, to some extent, a political one, it is difficult to say with certainty what the outcome will be.

- A more immediate problem is that the bulk of AGS' work is essentially project-related, rather than being SI in nature. NYNEX's objective is to add increasing amounts of value-added work to AGS in order to raise its capabilities and margins. The danger is that the sheer size of AGS will tend to keep it headed in the same project-oriented direction for some time to come.
- NYNEX has significant presence in the financial services, state and local government and manufacturing vertical markets. However, NYNEX has a much lower level of expertise and more limited product offerings in most other vertical markets. This situation contains two problems:

- NYNEX will find it harder to break into other markets without additional acquisitions.
- If the banking and brokerage sectors should themselves run into financial difficulties, NYNEX could be disproportionately affected.
- The NYNEX SI strategy is dependent on internal and external resources being orchestrated both on an ongoing (strategic) basis and for specific (tactical) SI jobs. This is difficult enough in any multi-divisional organization where different units have their own goals and schedules. This task is even more difficult in an organization that is built up through a number of different acquisitions, each with its own culture and method of operations.

In summary, NYNEX's problems are also its opportunities, and vice versa. That the problems inherent in NYNEX's strategy were evident from the beginning is grounds for optimism about NYNEX's approach. NYNEX has a strong management group that is working to take advantage of its position in the market.

#### 4. Markets Served

NYNEX ISG is particularly strong in the U.S., where INPUT estimates it receives over two-thirds of its revenues. BIS gives NYNEX a well-placed European position in its areas of expertise and has provided NYNEX with a position and operating units along the Pacific Rim.

NYNEX is exceptionally strong in the financial services markets, with its software and services offerings by BIS, Vista Concepts, and DISC, as well as AGS' professional services experience in this area.

Telco Research, NYNEX Development, and CSIG give ISG special telecommunications experience and business entrée.

AGS has manufacturing communications software as well as professional services experience in factory systems; however, NYNEX ISG does not yet have manufacturing sector experience that is nearly as deep as its financial sector experience.

#### 5. Recent Events

As noted above, NYNEX ISG has grown largely through acquisition. Acquisitions are made by NYNEX ISG itself, as well as through its AGS subsidiary, depending on how the acquisition will fit into ISG's overall business.

Examples of this strategy are two 1989 acquisitions by NYNEX's AGS Information Services:

- In July, AGS bought Multiple Technologies, a 200-employee, Michigan-based professional services firm specializing in the discrete manufacturing sector.
- In November, AGS acquired TELO Technologies, previously a subsidiary of Tampa Electric. TELO offers products and services to the utility industry.

This appears to be part of a pattern where small and/or lower value-added acquisitions are folded into AGS, rather than being maintained as separate entities or added to CSIG.

## 6. SI Organization

NYNEX ISG has 19 operating entities that are organized into seven operating units, as shown in Exhibit NYN-2. The NYNEX Complex Systems Integration Group (CSIG) is the chief vehicle for providing SI services, as its name would imply. CSIG typically serves as a general contractor, calling in resources from the other units of ISG, other parts of NYNEX, other subcontractors, and long-term or single-project partners. Services that CSIG provides are shown in Exhibit NYN-3.

The competencies of the other ISG units are briefly described below:

- *AGS Information Services*—Provides professional services to over 1,000 clients, largely through the design and implementation of custom information systems. AGS has expertise across many functional and vertical areas.
- *AGS Management Systems*—Provides project management software and system development methodologies
- *DISC*—Provides cash management, account reconciliation, and regulatory compliance software to U.S. banks
- *Systems Strategies*—Provides UNIX-to-IBM and VAX-to-IBM communications software
- *Vista Concepts*—Provides securities processing and trust accounting software
- *Eastern Design Company*—Supplies engineering and technical personnel
- *EDC Temps*—Supplies temporary office personnel
- *BIS Banking Systems*—Provides international banking software and services

EXHIBIT NYN-2

**NYNEX Information Solutions Group, Inc.  
Organization**

- NYNEX Complex Systems Integration Group
- AGS Computers, Inc.
  - AGS Information Services, Inc.
  - AGS Management Systems, Inc.
  - DISC, Inc.
  - Systems Strategies Inc.
  - Vista Concepts, Inc.
  - Eastern Design Company, Inc.
    - EDC Temps, Inc.
- The BIS Group Ltd.
  - Banking Systems
    - BIS Banking Systems Ltd.
  - Information Systems
    - BIS Applied Systems Ltd.
    - BIS Beecom International Ltd.
  - Marketing Information
    - BIS Mackintosh Ltd.
    - BIS Shrapnel Pty. Ltd.
    - BIS CAP International
  - Direct Marketing
    - Christian Brann Ltd.
    - Contact 24 Ltd.
- The DATA Group Corporation
- NYNEX Computer Services
- Telco Research Corporation
- NYNEX Development Company



EXHIBIT NYN-3

# **NYNEX Complex Systems Integration Group Services Offered**

- Consulting
  - Business strategy
  - Systems and communications needs analysis
  - Information/communications systems planning
  - Technology assessment
  - Equipment and systems evaluation and selection
  - Feasibility studies and RFP evaluation
  - Information/communications systems organization audits
- Systems and Network Design and Development
  - Prime contractor
  - Systems/network design, engineering, and development
  - Hardware, software and network integration
  - Custom software, development
  - Integrated network management systems
  - Systems integration development tools and methodologies
  - Local-area/metropolitan-area networks
- Systems Implementation
  - Project management
  - Contract management
  - Procurement, prototyping, testing
  - Documentation
  - Conversion
- Public and Private Training and Education
  - User skills
  - Technical seminars
  - Executive awareness seminars
  - Development skills
- Systems/Network Operation
  - Facility/network management
  - Technical support
  - Customer support
  - Maintenance
- Systems Re-Engineering
  - Maintenance
  - Redesign
  - Tools

- *BIS Applied Systems* and *BIS Beecom*—Provide professional services in the U.K.
- *BIS Mackintosh*, *BIS Shrapnel*, and *BIS CAP*—Provide consulting and market information to the information services industry
- *Christian Brann* and *Contact 24*—Provide direct marketing services in the U.K. and Australia
- *The DATA Group*—Provides software and services to customer services organizations
- *NYNEX Computer Services*—Provides professional services and video information services integration
- *Telco Research*—Provides call accounting software and professional services
- *NYNEX Development Company*—Develops new business opportunities. Currently developing products and services in LAN integration, integrated network management, and electronic funds transfer

## 7. SI Business Objectives

NYNEX's principal business objectives are:

- To obtain profitable business
- To control its account base
- To strengthen its non-SI business

Less important are follow-on hardware sales and follow-on systems operations contracts—which is reasonable, given its current legal constraints. NYNEX ISG is continuing to target a 25% compound annual growth rate and to increase margins. It has been getting half of its SI business from current accounts and half from new accounts.

## 8. Internal SI Capabilities Evaluation

### a. Business Consulting

CSIG offers business consulting directly as part of its front-end value-added services. BIS Applied Systems also offers business consulting as well as BIS Banking Systems in its focused area of expertise.

### b. Design Methodology, Design and Integration, Project Management, Software Development and Education, Training and Documentation

AGS Management Systems offers a series of software packages for project management as well as a system development methodology. BIS offers the Integrated Programming Support Environment (IPSE) package.

**c. Packaged Application Software**

Different operating units of ISG offer extensive applications packages, as described in Section 7, above.

**d. Packaged Systems Software**

Systems Strategies offers the connectivity software previously described.

**e. Standard Computer Hardware**

NYNEX does not generally offer standard computer hardware. One of the few exceptions is hardware and software from the DataMyte Corporation used in AGS Information Systems' factory data collection offering.

**f. Custom Computer Hardware**

NYNEX does not develop customized hardware.

**g. Network Management and Operations**

Given NYNEX's principal business, it is not surprising that network-oriented products and services are threaded into many of the offerings of ISG units:

- CSIG: Integration services
- AGS: Extensive development services
- Systems Strategies: Connectivity products
- Vista Concepts: On-line trading systems
- NYNEX Computer Services: Consulting
- Telco Research: Products and consulting for telecommunications management
- NYNEX Development: Local-area network (LAN) integrated products and services

## **h. Service and Repair**

Services and repair are not offered by ISG but are offered by another NYNEX affiliate, NYNEX Business Centers.

## **i. Software Maintenance**

Maintenance is offered as a standard part of NYNEX's various software products and is offered by the professional services units as a separate service to clients.

## **9. SI Strategic Alliances**

The NYNEX Corporation has many strategic alliances, ranging from telecommunications enterprises (e.g., France Telecom, Northern Telecom, Singapore Telecom) to relations with suppliers of its computer store division.

NYNEX ISG has loose reselling alliances with IBM, DEC, Stratus, and Tandem. None of these are exclusive or particularly close relationships. In Tandem's case, for example, NYNEX was the ninth integrator with which Tandem formed a reselling arrangement (others included BCS, EDS, SHL, SAIC, and GTE). NYNEX also has relationships with the leading on-line transaction processing hardware companies and inter-LATA carriers like MCI, AT&T, Telenet, and Tymnet.

## **10. SI Capabilities Summary**

NYNEX ISG has an exceptionally wide range of products and services that it can marshal under its SI umbrella. In addition, the NYNEX Complex Systems Integration Group can use other parts of NYNEX, subcontract, or form alliances with other vendors to bid and win systems and network integration contracts.

## **11. Marketing Strategy**

NYNEX ISG's marketing strategy is to build on its strong presence, including:

- The NYNEX Corporation's industry, systems, and network experience
- ISG's position in financial services, utility, manufacturing, and state/local government markets
- The market positions of AGS, BIS and Telco Research
- Growing focus on network integration (including complex LANs, metropolitan-area networks (MANs), and network operations management)

Being already strong in these diverse areas will allow ISG and its CSIG unit to directly attack the SI marketplace.

NYNEX's competitors exist on two levels:

- Andersen, CSC, IBM, and EDS for large, complex SI projects
- Computer Task Group and other value-added professional services firms for less complex SI jobs

## 12. SI Customer Base

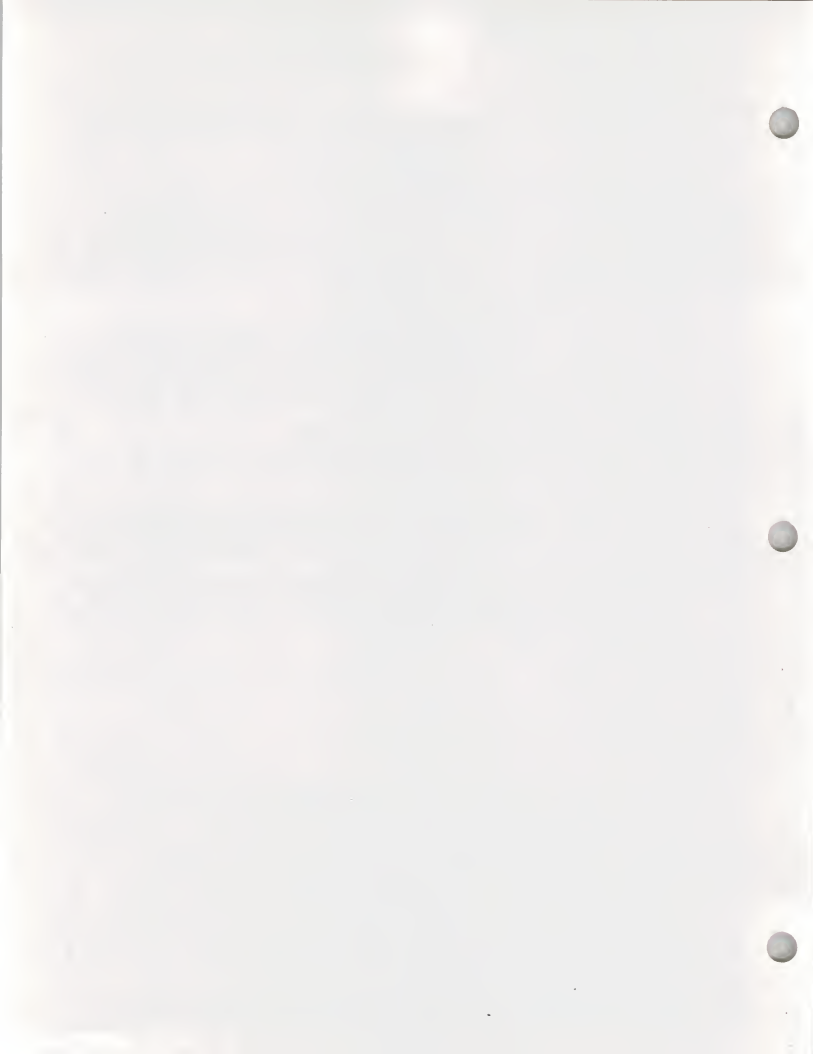
NYNEX indicates that since 1987 it has worked on 15 commercial SI jobs with an average contract value of \$25 million. NYNEX has not been involved in any significant U.S. federal SI projects, as its focus from the beginning has been on commercial and international markets.

## 13. Summary and Future Direction

INPUT believes that the near-term future of NYNEX's SI efforts will have these characteristics:

- Focus on contracts with high network integration content
- Further increase in the synergies between the different ISG units
- Selective acquisitions to increase its capabilities in targeted markets

NYNEX is obviously in SI (and information services) for the long haul. Other SI firms should expect NYNEX to be an even more aggressive competitor in the future.



## COMPANY PROFILE

---

PRC, Inc.

### 1. Key SI Contacts

#### **Commercial SI**

Bob Laurence  
President, Commercial Systems' Group  
PRC, Inc.  
1500 Planning Research Drive  
McLean, Virginia 22102

#### **Federal SI**

Paul Lombardi  
Vice President and Group General Manager,  
Applied Management Group  
PRC, Inc.  
1500 Planning Research Drive  
McLean, Virginia 22102

### 2. Description of Principal Business

Founded in 1954, PRC, Inc. (PRC) is currently a subsidiary of Black & Decker, a manufacturer of light industrial equipment and a broad range of home appliances and power tools. Merged with Advanced Technology, Inc.—another Northern Virginia-based management consulting and professional services firm—when they were both acquired from Emhart Corp. in 1989, PRC continues its primary lines of business: management consulting and advisory services, professional services (including information systems design, development, implementation and operations), and systems integration.

PRC has been in the commercial SI business for 15 years and in the federal SI business for 10 years.

INPUT's estimates of PRC's SI revenues for 1989, and its current SI staffing, are presented in Exhibit PRC-1.

PRC's SI projects are rather evenly split between commercial and federal projects; however, the dollar value is greater on the federal side. PRC reports that its average federal SI project has a value nearly four times the value of its average commercial SI project (more than \$6 million versus more than \$1.5 million, respectively).

## EXHIBIT PRC-1

**PRC's 1989 SI Revenue and SI Staffing**

SI Sector	Staffing	1989 Revenue (\$ Millions)
Commercial*	500-1,000	175
Federal*	2,000	200

\*Full-time only

**3. Competitive Position**

PRC gains competitive advantage from the breadth of its service offerings, which cover management consulting/professional services through follow-on operations. PRC gains additional advantage from its use of alliances to strengthen its capabilities and increase its responsiveness in the delivery of services and products. PRC also enjoys widespread name recognition and an excellent reputation, having been in business in the Washington, D.C. metropolitan area for more than 15 years.

**4. Markets Served**

PRC's primary targets in the SI market are vertical industry markets. The following targets were cited by PRC in INPUT's 1990 survey:

- Federal (DoD and non-DoD) agencies
- Large defense contractors
- Public utilities
- Commercial companies
- State and local governments

PRC cited response to customers' demands, control of its account base, and revenue/profit potential as its primary motivators in pursuing these targets. Secondary motivations were follow-on hardware/software sales and facilities management contracts, and strengthening its non-SI business.

**5. Recent Events**

In December 1986, PRC was acquired by Emhart. (At the end of 1987, Emhart also acquired ATI.) In April 1989, Emhart was acquired by Black & Decker. Shortly after, Black & Decker announced its intention to sell off both PRC and ATI. Black & Decker is currently merging the operations of PRC and ATI under the name PRC, Inc. This merger is scheduled to be completed by January 1991.



In November 1990, the Black & Decker Corp. decided to retain its systems integration subsidiary, after an 18-month search failed to yield a buyer.

In keeping PRC, Black & Decker is betting the company can build a commercial systems integration presence from its federal government base. Black & Decker also intends to purchase outsourcing services from PRC to cut costs and improve productivity.

## 6. SI Organization

Like many of its counterparts in the SI marketplace, PRC's SI organizations use a matrixed management structure. Although PRC did not identify its specific management structure, because of the current organizational changes in process, INPUT would expect it to permit PRC to use a few technology-oriented implementation groups to support any number of specialized client-oriented marketing groups.

Perhaps as a result of dealing heavily with the DoD, PRC's SI operations clearly support a mission-oriented management philosophy. The organization is distributed according to the percentages shown in Exhibit PRC-2.

EXHIBIT PRC-2

### Distribution of SI Staff Effort at PRC

SI Capability	Percentage
Management, support and planning	6
Legal support/contract administration	3
Project management	20
Systems development/implementation	45
Hardware/software evaluation/acquisition	15
Hardware engineering	6
Sales	3
Other security/administration	2

Like other SI vendors who deal principally with the DoD, PRC has chosen to operate its management and control functions in both centralized and decentralized fashion, as the particular circumstances require. Exhibit PRC-3 lists specific organizational responsibilities as either centralized, decentralized or both.

## EXHIBIT PRC-3

### Centralization/Decentralization of SI Business Functions at PRC

Responsibility	Commercial	Federal
Strategy & long-range planning	C	B
Marketing & promotion	D	B
Account management/sales	D	B
Contract review/approval	D	B
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	D	D
Systems operations	D	D

C = Centralized, D = Decentralized, B = Both

#### 7. SI Business Objectives

In common with other management services vendors, as well as traditional hardware vendors, PRC sees SI as a required response to customers' demands. As a successful management services consulting firm, PRC also cited the expectation of revenues/profits from its SI undertakings, as well as increasing control of its existing customer base, as primary objectives for its SI business. Secondary objectives include strengthening its non-SI business and follow-on business with the same clients.

#### 8. SI Capabilities Evaluation

PRC offers a full range of SI services, including consulting, design/integration, project management, hardware, communications products, systems software, etc. INPUT concludes from the concentration of SI effort in the area of application design and development, that this is the area of PRC's greatest capability and, therefore, where it has greatest marketing potential. PRC was one of the first companies to deploy an open systems operation based on the design of the Patent and Trademark Office (PTO) project. PRC is a recognized industry pioneer and leader in open systems architectures.

PRC does not rely only on its in-house capabilities. Alliances strengthen almost every SI capability that PRC offers, whether the in-house capability has great or little strength. INPUT sees this as a strength of PRC, leveraging both its strengths and its weaknesses to increase the scope and the responsiveness of its services. A substantial portion (approximately 20%) of PRC's SI effort is dedicated to project management services.

Coupled with PRC's extensive use of alliances, it appears that PRC can undertake many more concurrent SI projects than its staff could reasonably handle. PRC's self-assessment and use of alliances is described in Exhibit PRC-4.

## EXHIBIT PRC-4

### PRC's Self-Assessment of SI Capabilities and Use of Alliances

Capability	Strength (High/Medium/Low)	Alliance (Yes/No)
Business consulting	Medium	Yes
Design methodology	High	Yes
Design/integration	High	Yes
Project management	High	No
Software development	High	Yes
Education/training documentation	High	Yes
Packaged applications software	Medium	Yes
Packaged systems software	Medium	Yes
Standard computer hardware	Medium	Yes
Custom computer hardware	Medium	Yes
Communications hardware	Medium	Yes
Network management/operations	High	Yes
Service and repair	Medium	Yes
Software maintenance	Medium	Yes

It is interesting to note that PRC enhances and supplements all areas but its project management capabilities. It demonstrates how critical this activity is to PRC's success. PRC states that it seeks out opportunities to be both the prime contractor and subcontractor, as a particular project requires.

PRC rated itself highest in the software development and implementation areas; this is consistent with PRC's notable success with the operation of a multiple listing service for the real estate industry.

#### 9. SI Strategic Alliances

PRC is nearly unique in the scope of its alliances; other vendors, such as DEC, may have more alliance partners, but few others use alliances in so many areas, as shown in Exhibit PRC-4. PRC does not follow a corpo-

rate alliance program governing its use of alliances. PRC's alliances are primarily on a contract-by-contract basis. However, the breadth of PRC's use of strategic alliances clearly show it to be a full-service, fully responsive SI services vendor.

PRC takes a pragmatic view with respect to strategic alliances, using its alliances, as appropriate, to accomplish the following goals:

- New market penetration
- Access to new technology development and product distribution
- Reduced development costs in specialized areas
- To permit PRC to participate as prime or subcontractor, as appropriate

PRC uses long-term alliances primarily for market focus or penetration. *Ad hoc* alliances are used to achieve the strongest possible SI project team to meet the client's needs.

A brief sample of PRC's alliances is presented in Exhibit PRC-5.

EXHIBIT PRC-5

**Brief Sample of PRC's SI Alliances**

Alliance With	Purpose
DEC	Computer hardware maintenance
HP	CRT terminals
IBM	Hardware maintenance
Xerox	Hardware—new technology

**10. SI Capabilities Summary**

PRC offers the full range of SI capabilities to compete in the SI marketplace.

Alliances, covering nearly every important area, are a major advantage. INPUT believes that PRC's creative use of alliances to strengthen, as well as broaden, its services offerings should permit it to grow at a faster rate than some more conservative SI services vendors. PRC enjoys exceptional name recognition in the marketplace.

Some of PRC's major strengths are the following:

- Use of CASE/software engineering for large-scale, complex systems implementations

- Ability to offer industry-specific software products, such as the Multiple Listing Service for the real estate industry
- Specialized capabilities in artificial intelligence, computer security and software engineering
- Specialized communications expertise in all the areas of local-/wide-area networks and satellite communications
- Document imaging systems and integration

INPUT found no major weaknesses in PRC's SI services offerings that could interfere with its success in the SI marketplace.

### 11. SI Marketing Strategy

PRC's SI target markets are primarily vertical industries/organizations. PRC selects its market targets carefully, according to the following criteria:

- Value-added content of project
- Potential for application of existing software technical expertise
- Potential for technology transfer, or previous work for client
- Potential profitability of a project

PRC is organized into three main operating groups:

- The Commercial Systems Group provides nationwide computer-based Multiple Listing Service (MLS) operations, and computer-aided dispatch systems. The group serves as the commercial SI arm of the company.
- Applied Management Group is oriented toward systems integration, information and imaging systems, and facilities operation and maintenance, primarily for the U.S. government.
- Engineering Technology Group is primarily focused on tactical systems integration and technical services in support of C<sup>3</sup> systems, combat, and space systems for federal government agencies.

In addition, environmental Management, Inc. is a wholly owned PRC, Inc. subsidiary, focusing on the environmental services marketplace.

PRC, in its SI operations, clearly has a wide range of expertise available to meet a client's specialized requirements.

- Competitors - PRC's primary competitors in both the commercial and federal sectors of the SI marketplace are identified in Exhibit PRC-6.

## EXHIBIT PRC-6

**PRC's Primary Competition**

Sector	
Commercial	Federal
CSC EDS IBM TRW	CSC Unisys SAIC Martin Marietta

- Positioning - PRC has positioned itself as a full-service SI services vendor, capable of delivering responsive and productive systems. Leveraging its record of on-time delivery, its technical strength and long-term track record, PRC emphasizes its implementation and integration capabilities and its post-implementation operations support offerings.
- Promotion - PRC relies on word-of-mouth client referrals, buttressed by trade shows and advertising in trade and industry publications. PRC finds advertising somewhat less effective than either trade shows, conferences, or client referrals.

**12. SI Customer Base**

PRC reports having undertaken over 200 SI projects since the beginning of 1988; these projects average more than \$1.5 million in the commercial sector and more than \$6 million in the federal sector. Some of PRC's typical SI projects are presented in Exhibit PRC-7.

## EXHIBIT PRC-7

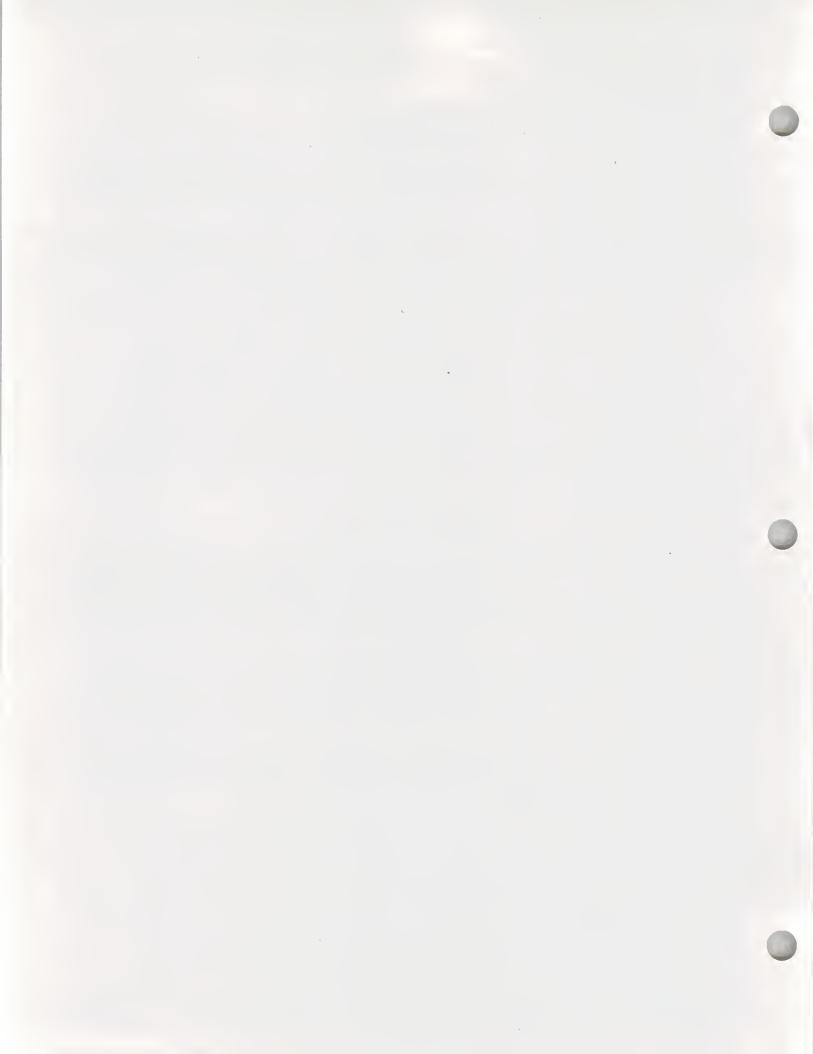
Examples of PRC's SI Projects	
Customer	Description
Dept. of Commerce	Patent & Trade Mark Office Automated Patent System
Dept. of Veterans Affairs U.S. Senate	Integrated Hospital System Network integration —provide data network for entire U.S. Senate
Navy	EDMICS - a CALS project to automate engineering data
NASA HQ	Operations management and communications network design, implementation and maintenance
General Dynamics	Integrated system for electronic capture and distribution of drawings

### 13. Summary and Future Directions

PRC's strengths include its recognized success in developing, implementing, and operating industrywide application systems, such as the Multiple Listing Service. Also, PRC's ability to offer all required SI capabilities, either in-house or via a strategic alliance, provides additional strength.

INPUT found no major weaknesses in PRC's SI capabilities. The move by parent Black & Decker to retain and invest in PRC, Inc.'s future demonstrates its confidence in the firm's capabilities and its ability to compete effectively in the SI marketplace. INPUT expects PRC to be a strong competitor in the SI marketplace as long as it chooses to be.

Successful for 35 years, through good and bad economic times, PRC is not just doing "something" right; it is clearly doing nearly everything right.





## COMPANY PROFILE

### Price Waterhouse

#### 1. Key SI Contacts

Mr. Tom Beyer  
MCS Vice Chairman  
Price Waterhouse  
1801 K Street  
Washington, D.C. 20006

Mr. Robert H. Cawly  
Managing Partner  
Applied Technology Center  
1410 North Westshore Boulevard  
Tampa, FL 33607  
(800) 825-1282

#### 2. Principal Business

Price Waterhouse is a leading management consulting organization focusing on all aspects of enterprise integration. Price Waterhouse has been active in the federal SI market for nearly 10 years and in the commercial SI market for five years.

Price Waterhouse reports its fiscal year 1989 (July 1989-June 1990) SI revenues as approximately \$400 million. This figure is broken down as shown in Exhibit PW-1. Equipment costs included in systems integration projects are not included in these revenues.

PW-1

#### Price Waterhouse Systems Integration Revenues 1989

Business Component	\$ Millions
Commercial	325
Federal	75

#### 3. Competitive Position

Price Waterhouse maintains a quality reputation as a management consulting firm. Its experience in project management and its understanding of the client's needs, coupled with its vertical industry and risk contain-

ment knowledge, give it a competitive advantage in many market and industry segments. Major service offerings from Price Waterhouse include:

- Software refurbishment using proprietary systems reengineering products such as ARRAE
- Industry-specific software for the retail, oil and gas, utilities, banking, and insurance markets
- Generic package software implementation, including supporting tools and methodologies
- Strategic selling using proprietary Sales Force Automation and Marketing software
- Change integration services to assist companies in introducing new technologies through business reengineering

Price Waterhouse has a strategic alliance program to complement all services it provides. Through the Price Waterhouse National Vendor Alliance Program, long-term alliances with various package software vendors permit Price Waterhouse to develop tailored solutions for clients' needs.

Price Waterhouse has taken an innovative approach to the SI market by focusing on Enterprise Integration. It has developed a service plan that embodies a "Client Bill of Rights" to ensure its clients receive value-added service. This provides Price Waterhouse with a means of measuring and managing its client relationships through its Quality Management Program.

A series of knowledge-based tools has been developed by Price Waterhouse to reduce the labor and resources required for software development and package implementation. These tools were developed to strengthen Price Waterhouse's competitive position in large SI projects, and to guarantee a high degree of client participation and ensure client system ownership.

#### **4. Markets Served**

Price Waterhouse's primary targets in the SI market include both functional and vertical industry targets, as shown in Exhibit PW-2.

## EXHIBIT PW-2

**Price Waterhouse's SI Target Markets**

Functional	Vertical Industry
Financial and treasury management	Manufacturing
Human resources	Retail
Sales and marketing	Oil and gas Utilities
Software re-engineering/ CASE tools	Law firms
Business re-engineering	Insurance Banking

The principal motivation for Price Waterhouse's services in these markets centers on serving its existing clients with the services they require. Price Waterhouse markets its services primarily to major multinational corporations. Typical Price Waterhouse clients include:

- Fortune 1000, Forbes 200 companies
- Companies with revenues greater than \$1 billion
- Large public sector operations and government agencies
- Financial institutions with over \$1 billion in assets
- Significant public utilities and oil companies

Price Waterhouse expects to provide its (or alliance partners') proprietary software as a byproduct of its SI business. The firm is retaining strong relationships with its existing client base and strengthening its non-SI services in strategic management and industry consulting programs.

**5. SI Organization**

Both Price Waterhouse's commercial and federal SI organizations report to Tom Beyer, MCS Regional Vice Chairman. Price Waterhouse's operating functions are aligned to the geographic market, with "expert" resources organized nationally to provide local practice support, as shown in Exhibit PW-3. The Applied Technology Center and Price Waterhouse Technologies are two such organizations.

Price Waterhouse employs approximately 2,000 full-time specialists in its commercial SI operation; approximately 500 full-time employees are assigned to its federal SI operation.

## EXHIBIT PW-3

### Price Waterhouse National/Regional SI Business Alignment

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	C
Marketing and promotion	C	C
Client management	D	D
Contract review/approval	D	D
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	D	D
Vendor alliances	C	C
Technology research and development	C	C
Quality management	D	D

C=Centralized, D=Decentralized, B=Both

#### 6. SI Business Objectives

Unlike most traditional equipment-vendor-turned-SI-services-vendor, Price Waterhouse does not provide a distribution channel to sell computer hardware and software. Price Waterhouse's policy is to receive no commissions or markups for other products included in its integration projects. These savings from discounts and commissions are passed on to the client to reduce the overall cost of the SI projects.

Price Waterhouse's focus on SI is driven by the client and not the vendor. Accordingly, Price Waterhouse provides its service under Enterprise Integration, a concept to build the internal capability of the client, maintain focus on the business objectives, and provide value-added solutions leading to a mutually beneficial client relationship. In this respect, Price Waterhouse believes it has distinguished itself from traditional technology providers that provide hardware, software, or other technology as a means to drive their SI practices. Under Price Waterhouse's Enterprise Integration approach, a client still receives all of the benefits associated with an integration contract (i.e., prime contractor to assume risk, performance, etc.) but with a much greater degree of control in terms of cost and service delivery since Price Waterhouse contends that it is unbiased to a particular vendor's equipment or software.

Price Waterhouse has long-term alliances with packaged applications software vendors and various hardware vendors. In response to INPUT's SI survey, Price Waterhouse has identified a number of contract-by-contract alliances that strengthen its capabilities in a number of areas. These alliances are identified in Section 8.

## 7. SI Capabilities Evaluation

Price Waterhouse offers management advisory services that address all the requirements of the SI market; it offers products and technical services to satisfy most of the common SI requirements. These products and services satisfy all the requirements of the SI market in which Price Waterhouse presently chooses to compete. Exhibit PW-4 presents Price Waterhouse's self evaluation in the primary SI capabilities.

EXHIBIT PW-4

### Price Waterhouse's Evaluation of Capabilities

Capability	Strength	Alliance
Business consulting	High	No
Design methodology	High	No
Design/integration	High	No
Project management	High	No
Software development	High	Yes
Education/training/documentation	High	No
Packaged applications software	High	Yes
Packaged systems software	High	Yes
Standard computer hardware	High	Yes
Communications hardware	High	No
Network management/operations	Medium	Yes

## 8. SI Strategic Alliances

Price Waterhouse uses alliances to strengthen its SI capabilities. Primary alliances are with various packaged software vendors and hardware vendors. Given that Price Waterhouse audits many of the large hardware companies, special arrangements have been developed to provide client solutions, while protecting the independence of the audit relationship. Price Waterhouse does not disclose the products or services offered by its alliance partners. Exhibit PW-5 presents a sample list of Price Waterhouse's SI alliances.

## EXHIBIT PW-5

**Price Waterhouse  
Limited Sample of SI Alliances**

Vendor	Contract Basis
Third-party packaged software vendors	Strategic alliances
<ul style="list-style-type: none"> <li>• Applications</li> <li>-Dun &amp; Bradstreet Software</li> <li>-Walker Interactive</li> <li>-Oracle</li> <li>-Software 2000</li> <li>-JD Edwards</li> <li>-Tesseract</li> <li>-Integral</li> <li>-PeopleSoft</li> <li>-Comshare</li> <li>-Ross Software</li> <li>-SAP</li> <li>-IMRS</li> <li>• Tools</li> <li>-Index Technologies</li> <li>-Knowledge Ware</li> <li>-Bachman</li> <li>-McCabe</li> <li>-AdPac</li> <li>-AdvantEdge</li> <li>-Approximately 14 others</li> </ul>	
EDS	Contract-by-contract
CSC	Contract-by-contract
IBM	Contract-by-contract
DEC	Contract-by-contract
Hewlett-Packard	Contract-by-contract
Texas Instruments	Contract-by-contract
Sequent	Contract-by-contract
Arix Corporation	Contract-by-contract

Clearly, Price Waterhouse sees packaged software as the key to long-term performance in the SI market.

## 9. SI Capabilities Summary

Price Waterhouse has restricted its SI offering to those capabilities that are best supported by the traditional management consulting organization. It offers none of the following directly: computer and communications equipment, systems software, custom computer hardware, equipment service and repair, and facilities management. It does, however, provide business consulting, systems design and integration, project management, and in-house software design and development.

Price Waterhouse shows strength in its software engineering capabilities, especially in its CASE tools and software re-engineering services. Also, its access to industry-specific software strengthens its position when it bids for services to a specific vertical industry.

Price Waterhouse shows a current weakness in that it is not staffed to address very large SI projects; however, its strengths clearly identify it as a capable player in the SI market. INPUT's evaluation of Price Waterhouse's SI capabilities is presented in Exhibit PW-6.

EXHIBIT PW-6

### INPUT's Evaluation of Price Waterhouse's SI Capabilities

Strengths	Weaknesses
Industry-specific software	Large project experience
In-house management expertise, especially project and program management	
Technical expertise, especially software engineering	
Long-term client support	

## 10. SI Marketing Strategy

Price Waterhouse's marketing strategy is consistent with its matrixed management style; it targets a combination of functional and vertical industry markets (per Exhibit PW-2). Although Price Waterhouse targets only the largest companies as its preferred market, it must be considered somewhat a niche SI services vendor, since it has not chosen to provide follow-on services such as systems operation.

- Competitors - Price Waterhouse identifies its primary competition as the following vendors:

Commercial Market

Andersen Consulting  
Deloitte Touche  
Ernst & Young  
KPMG Peat Marwick

Federal Market

AMS  
Andersen Consulting  
Booz-Allen Hamilton  
KPMG Peat Marwick

All of the vendors identified above are management services vendors; none is an equipment manufacturer, which supports Price Waterhouse's focus on hardware vendor alliances for specific SI engagements rather than long-term relationships.

- Positioning - Price Waterhouse has positioned itself as a vendor of management/advisory services related to SI requirements; Price Waterhouse could serve as a prime contractor for a major SI project but it could not perform as a sole contractor, since it does not offer all the basic SI capabilities. Price Waterhouse has made a good start toward covering the required capabilities by its strategic and ad hoc alliances with well-known and acknowledged leaders in their own areas of excellence.
- Promotion - Price Waterhouse has implemented programs and tools to improve its capability and visibility in the SI market. In addition, it utilizes public seminars, direct sales, and cooperative sales, with and through its alliances, to identify new client prospects. Price Waterhouse has reported to INPUT that more than one-half its SI projects are undertaken in response to a request for proposal.

At this time, INPUT has no specific data on SI projects undertaken or completed by Price Waterhouse.

## 11. SI Customer Base

Consistent with its auditing and management consulting background, Price Waterhouse declined to identify any clients or projects for this report.

## 12. Summary

Price Waterhouse's strengths include its highly respected name as a management consulting firm, its project management expertise, methodologies, alliances, and its development of proprietary software engineering tools and techniques.



Its choice not to offer computer or communications equipment, including service and repair or operations, supports its focus on those areas where it has established in-house expertise and formed strong alliances. By focusing on what it does well and managing the sales and implementation process, Price Waterhouse will continue to remain strong in the systems integration market.



## COMPANY PROFILE

---

### Science Applications International Corporation (SAIC)

#### 1. Key SI Contacts

##### Commercial

V. N. Cook  
Vice Chairman of the Board  
Commercial and International Segment  
1710 Goodridge Drive  
PO Box 1303  
McLean, VA 22102  
(703) 448-6446

##### Federal

James E. Russell  
Sr. Vice President  
1710 Goodridge Drive  
P.O. Box 1303  
McLean, VA 22102  
(703) 821-4443

#### 2. Description of Principal Business

Science Applications International Corporation (SAIC), founded in 1969 as Science Applications, Inc., offers diversified research and engineering services as its primary product, with the researchers and managers themselves owning the company. The company offers technical and professional services in the fields of national security, energy, environment, transportation, and health. SAIC is also involved in the custom assembly of special-purpose computer systems and the manufacture of certain high-technology products. SAIC has been in the federal systems integration (SI) business for 20 years and in the commercial SI business for 13 years. SI is handled by independent groups within SAIC.

SAIC provides the federal government with a variety of SI and system operations services as well as professional services and high-technology products. Advanced technology products and services are also sold to commercial clients.

SAIC is one of the country's largest employee-owned companies. It has more than 13,600 employees in 200 offices worldwide. SAIC also has one of the most highly educated staffs in the industry. Fifty-five percent hold bachelor of science or arts degrees; thirty-four percent hold masters degrees; and eleven percent hold doctorate degrees.

Through FY 1991, ending in January 1991, SAIC had enjoyed over twenty years of growth at a compounded rate of almost 24% per year. Federal budget uncertainties during calendar year 1991 have slowed that growth. Total FY 1992 revenue reached \$1.285 billion. This is a 10.5% increase over FY 1991 revenue of \$1.163 billion. Net income rose less than 1%, from \$33.3 million in FY 1991 to \$33.6 million in FY 1992. Net income dropped from 2.86% of revenue in FY 1991 to 2.61% of revenue in FY 1992, which was below SAIC's profit plan. Revenues from systems integration rose from \$569 million to \$653 million, with the commercial systems integration percentage of that dropping to 19% from 25%, as shown in Exhibit SAI-1.

Exhibit SAI-2 shows revenue for the past nine years. During this shorter period, SAIC has shown remarkable revenue growth. For the six years ending in 1989, SAIC had a compound annual growth rate of almost 20%. This growth has slowed during the last three years. In FY 1992, SAIC achieved record contract awards of \$2.76 billion, almost a 50% increase from FY 1991. INPUT estimates that 88% of SAIC's revenue comes from the federal government.

## EXHIBIT SAI-1

**SAIC**  
**1991-1992 Systems Integration Revenues**

Business Component	\$ Millions	
	1991	1992
Federal	427	527
Commercial	142	126

SAIC estimates that its SI revenue will grow at an average annual rate of 15% for commercial SI and 10% for federal SI.

## EXHIBIT SAI-2

## SAIC Historical Revenue

Year	Revenue (\$ billions)	Percent Increase
1984	354	22
1985	420	19
1986	533	27
1987	600	13
1988	694	16
1989	865	25
1990	1,022	18
1991	1,163	14
1992	1,285	10.5

The company's business is directly related to receipt of contract awards and contract performance. Therefore, the financial data should be viewed with regard to the following information:

	Year ended January 31		
	1992	1991	1990
Number of Contracts:			
Awarded	4,092	4,068	3,739
Completed	4,625	4,480	2,823
In process at year end	4,838	5,371	5,783

The average funded value per contract awarded was \$334,000 in 1992, \$278,000 in 1991 and \$307,000 in 1990. The number of contracts completed and in process at year end, as well as the average funded value per contract award, is affected by U.S. government procurement and contracting practices, particularly with respect to contract value and period of performance for both long-term and short-term contracts.

### 3. Competitive Position

SAIC started out as a defense contractor and has continued to support the Department of Defense (DoD) in a variety of classified and unclassified projects. In 1984, the company became one of the ten system architects for the Strategic Defense Initiative.

Recently, SAIC has branched out into a variety of other federal areas. These projects are expected to provide the basis for a commercial SI business. The most obvious example is SAIC's pursuit of business in hospital information systems. In 1986, SAIC won the contract for Stage I of what was originally called the Tri-Service Medical Information System (TRIMIS). This contract, valued at \$27.3 million, covered the design and development of a medical information system for military hospitals.

Stage II, valued at just over \$1 billion, was awarded to SAIC in 1988. It covers implementation and follow-up support of what is now called the Composite Health Care System (CHCS). SAIC is using the project as a foundation for commercial hospital support computer systems.

In October 1989, SAIC acquired Di-Star Medical Systems Corporation, its principal subcontractor on CHCS. It had previously acquired the Software Products Division of Control Data Corporation. Using these two groups as well as other internal resources, SAIC developed its own product line for medical information named "SAIC-Care." As a result, INPUT expects SAIC to become a major force in commercial medical hospital systems.

SAIC is expected to repeat this approach in other areas. For example, it is now pursuing SI work in automated toll collection and automated vehicle identification systems based on previous work in the defense sector. Rather than treating SI in a global sense, SAIC is pursuing discrete SI opportunities in industries in which it already has both experience and qualifications. Using this as a base, it will then expand to other related industry sectors.

With respect to SI contracts, SAIC has completed or is in progress on 830 contracts of which 670 are federal. SAIC estimates that the average contract value is \$2.1 million for commercial contracts and \$3.9 million for federal contracts. SAIC has found contract values increasing for both its commercial and federal SI contracts.

SAIC estimates that 70% of its total commercial and federal SI contract value is in professional services, with 15% coming from equipment and 15% coming from packaged software. SAIC also estimates that 85% of its SI projects involve distributed systems and 15% involve mainframe systems.

#### 4. Markets Served

As already noted, SAIC services primarily the federal market, principally the DoD. In addition to the CHCS, described above, the following represents a partial list of other SAIC SI projects:

- FBI Automated Fingerprint Identification System
- Environmental Protection Agency—Mission Oriented Systems Engineering Support (MOSES)
- Orlando-Orange County Expressway Authority—Computerized toll collection and traffic management
- Department of Veterans Affairs—Integrated Data Communications Utility
- Boeing Computer Services—Reserve Component Automation System (RCAS) subcontract
- Defense Advanced Research Projects Agency (DARPA)—Center for Seismic Studies

SAIC's principal business involves the application of scientific expertise, together with computer and systems technology, to solve complex technical problems for government agencies and industrial customers. The skills of the professional staff encompass a variety of scientific and technical disciplines. SAIC's management structure is based upon broad technological groupings, not necessarily related to any particular industry, line of business, geographical area, market, or class of customer. It pursues functional markets rather than vertical markets.

For purposes of analyzing and understanding the company's financial statements, its operations have been classified into two broad segments: Technical Services and Products. The Technical Services segment is further classified into the National Security business area and all other business areas. Other business areas include energy, environment, health, space, transportation, and commercial information technology.

The Technical Services segment consists of applied and basic research; analyses and development of new and existing policies, concepts, systems, and programs; design and development of computer software; systems engineering; systems integration; test and evaluation of new products or systems; technical operational and management support; environmental engineering; and engineering support to existing facilities, laboratories, and systems.

The Products segment includes custom-designed and standard hardware and software products such as data display devices, "ruggedized" personal computers, sensors, nondestructive imaging instruments, and document imaging systems. These products typically incorporate company-developed hardware and software as well as hardware and software manufactured by others.

Exhibit SAI-3 presents a three-year summary of revenue by business segment.

## EXHIBIT SAI-3

**SAIC**  
**Three-Year Source of Revenue Summary**

Contract Revenues	(\$ Millions) Year Ended January 31		
	1992	1991	1990
<u>Technical Services</u>			
- National Security	678,595,000	621,828,000	587,333,000
- Other	513,305,000	471,019,000	343,829,000
<u>Products</u>	91,204,000	68,974,000	88,720,000
Interest Income	190,000	1,113,000	2,339,000
<b>Total Revenues</b>	<b>1,283,294,000</b>	<b>1,162,934,000</b>	<b>1,022,221,000</b>

SAIC targets the following business areas:

- National security
- Energy
- Environment and health
- Space
- Transportation
- High-tech products



A majority of SAIC SI business comes from its existing client base, with 60% of the commercial business and 70% of the federal business coming from installed base. SAIC is experiencing stable margins of 6%. SAIC estimates that it is the prime contractor for 60% of its SI revenue, subcontractor for 15%, and gives support to projects managed by clients for 25%.

Although SAIC is the prime contractor much of the time, its dependence on the federal government has kept its margins on integration components in the low to medium range. Exhibit SAI-4 shows the integration component and the relative margin for each.

EXHIBIT SAI-4

**SAIC Relative Profit Margins**

Integration Component	Relative Margin
Standard Hardware and Software	L/M
Customized Hardware and Software	L
Software Packages	L
Consulting/Design/Integration	M
Custom Software Development	M
Project Management	M
Training and Education	M
Post-Installation Operations	M

H = High, M = Medium, and L = Low

**5. Recent Events**

SAIC was actively involved in Operation Desert Storm. Operation Desert Storm had exposed the need for more advanced military information systems in many areas. Two major awards to help upgrade troop mobilization and war planning have positioned SAIC as a major contributor in this area.

SAIC brings the newest in office automation, telecommunications, and information engineering technology to help the U.S. Army better mobilize its reserve forces. As a subcontractor to Boeing, SAIC is helping develop the Reserve Component Automation System (RCAS) to replace the manual tracking and telephone surveys used to mobilize reserves for the Gulf War.

*Manufacturing Control*—SAIC information systems will help the Army better control remanufacturing of truck and tank engines, generators, and other equipment at the new Consolidated Maintenance Facility at Tooele Army Depot in Utah. A microcomputer-based data collection system, integrated by SAIC, will use 300 bar code readers to track work in progress.

*Geographic Information Systems*—SAIC has emerged as a leader in geographic information systems (GIS). Working with the Defense Mapping Agency Systems Center and U.S. Army Topographic Engineering Center, SAIC helped develop national and international standards for GIS data bases. SAIC also helped design the Hydrographic Source Assessment System and DMA Modernized Catalog System.

*War Planning Systems*—As one of the major systems integrators in the nation, SAIC has the experience and capability to link disparate command components into a unified whole. SAIC has begun developing interfaces to link four important Air Force and Navy command and control systems at the theater commander, force, component, and unit levels.

Components of the first system, the Contingency (Tactical Air Command & Control System) Automated Planning system, or CTAPS, proved critical in the Desert Storm victory. SAIC was the sole company selected to integrate this Air Force system now designated as the Joint Service architecture for air tasking order interoperability. The system incorporates powerful reduced instruction set computing (RISC), expert systems, and state-of-the-art applications software on a distributed platform. The metasystem communicates over a broadband LAN-WAN-LAN network featuring fiber optic and wireless cellular ethernet.

At the unit level, SAIC's Wing Command and Control System (WCCS) provides real-time decision support to Air Force wings. With its many interfaces to "stovepipe" systems, WCCS gives commanders and staff on-line access to up-to-date information on mission schedules, pre-mission briefings, maintenance data, aircrew preparation, and weather status. Air Force staff will also benefit from a new automated scheduling capability for air crews and air operations, as well as new interfaces to exchange information with logistics, maintenance, munitions and operations specialists.

SAIC is also developing interfaces to link these systems with the Navy Tactical Command System-Afloat (NTCS-A), which it helped develop. NTCS-A covers the whole gamut of C<sup>2</sup> from operational commanders to intelligence support to all operations-related data bases on board ships. SAIC has worked on all aspects of this rapid prototype.

These three programs—CTAPS, WCCS and NTCS-A—epitomize the new DoD “common systems operating environment” concept—nonvendor-specific software, common hardware, and common mapping.

Together with these go-to-war systems, SAIC is interfacing the Operations Support Systems (OSS). The company developed and installed this joint theater command and control system at USCINCPAC and USCINCLANT and five Navy Theater Command Centers. This prototype command center incorporates Ada software engineering, supercomputer technology, and a LAN-WAN network. SAIC's effort also includes acoustic surveillance, data fusion, multi-target contact management, and C<sup>2</sup> decision aids and simulations.

For the 11th Air Force, SAIC is augmenting the Commander Tactical Information System (CTIS). This rapidly prototyped, computer network-based command and control system assimilates tactical data from a multitude of sources and sensors for use in the Alaskan military theater. By assisting in the creation and dissemination of mission tasking and by providing continuous, secure communications, CTIS played a major role in the recently completed Arctic Warrior exercise that SAIC heavily supported.

Among its other C<sup>2</sup> projects, SAIC delivered a breakthrough system that closes the Greenland-Iceland-United Kingdom gap as well as the gap between wartime and peacetime surveillance systems. SAIC's Link-11 satellite center command and control system acts as an automated link between NATO's Air Defense Ground Engagement System and the North American Environment Air Defense System. Ensuring continuous live aircraft tracking between the two systems, Link-11 greatly improves air surveillance and airspace management for military and commercial transatlantic flights.

*Logistics/CALS Technology*—The acquisition of Logistic Systems Architects (LSA) allows SAIC to offer a robust, top-to-bottom, full life cycle logistics capability. Specializing in Computer-aided Acquisition and Logistics Support (CALS), LSA established the Lead Service CALS Test Bed for the Air Force.

Supply support and post-acquisition logistics systems by LSA provide accessible, on-line information. These systems help the Air Force Logistics Command (AFLC) staff reduce order and ship time, improve inventory accuracy, and simplify requirements determination. For the F-117A stealth fighter program, an LSA system shortened the procurement cycle by more than 90 days.

Since then, LSA has revised and updated the Headquarters Air Force Supply Master Plan, incorporating lessons learned from Desert Storm, goals from the Air Force Logistics 2010 document, and Defense Management Review Directives. The plan will serve as a blueprint for future functional and technical development for the supply community.

*Toll Collection Systems*—SAIC's Intelligent Vehicle Highway System (IVHS) and Electronic Toll Collection and Traffic Management systems help combat growing traffic congestion. SAIC recently won two multi-million-dollar contracts to design and install advanced toll collection systems at the Tobin Bridge in Boston and on the Orlando-Orange County Expressway in Florida.

*Health Care*—SAIC continues to develop and implement SAIC-Care, the integrated hospital information system for domestic and international markets. In February 1992, SAIC activated a customized SAIC-Care system at the Lakeside Department of Veterans Affairs Medical Center (VAMC) in Chicago. SAIC will also install SAIC-Care for VAMC at Big Spring, Texas, in fall 1992. When completely installed at both sites, the central system at Lakeside will provide more than 2,000 users with up-to-date, on-line patient information.

Internationally, SAIC-Care is automating and integrating clinical and administrative functions at three hospitals and one laboratory in Regina, Canada.

Finally, with help from SAIC, Brigham and Women's Hospital in Boston plans to operate their information systems entirely on a network of personal computers—4,000 PCs running 96 hospital applications. SAIC's Hyper-M™ programming tool will have a key role in this systems integration effort. This innovative, PC-based product couples a powerful object-oriented user interface with sophisticated, distributed data base technology to help MUMPS programmers work faster and smarter.

SAIC been successful with imbedded instrumentation and control systems. Though these are not traditional SI, they do involve SI capability. The following examples illustrate how a traditional SI organization can be successful with plant monitoring, plant control, security, and supervisory control and data acquisition (SCADA) systems.

***Plant Monitoring Systems***—SAIC's role as a leading systems integrator for the power industry continues to expand into significant new areas. Building on its baseline plant monitoring systems, SAIPMS, SAIC developed a water chemistry application. Featuring an innovative approach to data capture, the water chemistry system collects, stores and analyzes data generated by plant in-line process instrumentation in real time, representing an important step toward distributed intelligent front-end processing.

***Control Systems***—SAIC plant control systems take advantage of extensive engineering, software design, and regulatory expertise. They develop and install new plant computer systems as well as upgrade and greatly expand the capabilities of existing systems through "seamless" interfaces with emergency response capabilities and radiological release information, nuclear steam supply, and safety parameter display systems. SAIC recently installed new systems at Portland General Electric's Trojan Plant, as well as an upgraded system at the Tennessee Valley Authority Brown's Ferry Plant.

***Safeguards and Security Systems***—SAIC security systems help ensure the safety of nuclear and non-nuclear facilities. SAIC won important awards for security system upgrades for Virginia Electric Power's North Anna Nuclear Station and for Rochester Gas & Electric's Ginna Nuclear Station.

***Oil and Gas SCADA Systems***—SAIC has nearly completed two large supervisory control and data acquisition (SCADA) systems for ARAMCO in Saudi Arabia. Recently field tested and commissioned, the SCADA system for central dispatch in Dhahran will manage more than 15 pipelines, nearly 250 multiplexers, and 20,000 input/output points.

SAIC engineering teams continued developing and customizing SCADAs for Public Service Electric & Gas of Newark and the Louisiana Offshore Oil Port (LOOP). The former system supplies data for natural gas supply management and sendout accounting. The latter has a special batch tracking application to control the movement of crude oil from LOOP to underground storage caverns.

In May 1992, SAIC announced plans for a 45 Mbps cell-relay transmission service called X.Lnet. It will be used to interconnect frame-relay or switched multimegabit data services (SMDS). SAIC will use Witel Communications Systems Inc.'s nationwide fiber optic network. This service can provide nationwide switched high broadband service. SAIC has stated that this capability will be strategic to future SI business.

In July 1992, SAIC acquired General Sciences Corporation of Laurel, MD, a \$15.4 million services firm with ties to NASA and National Weather Service programs. General Sciences will give SAIC a window into two major federal SI programs. General Sciences is a member of the

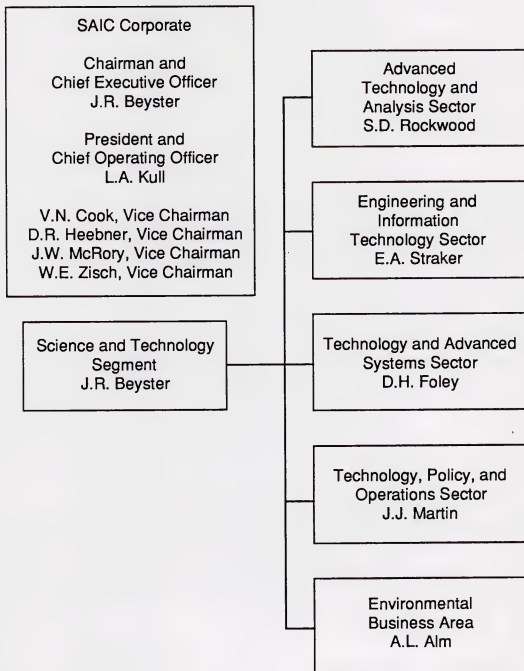
TRW Inc. team pursuing the Earth Observing Satellite Data and Information System (EOS-DIS) contract and has been working with the National Oceanic and Atmospheric Administration on the Advanced Weather Interactive Processing System.

In July 1992, SAIC acquired the service unit of Touch Communications Inc. of Campbell CA. SAIC will operate the unit as its Open Systems Division with responsibility for providing open system interconnection services. This division will target the federal government, original equipment manufacturers, telephone companies, and other large businesses.

## **6. Organization**

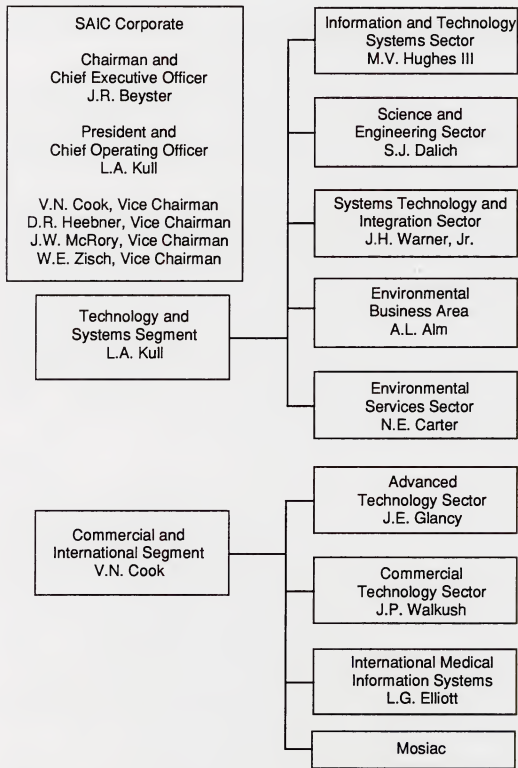
Systems integration activities are conducted within several of the operating divisions of SAIC. The organization chart in Exhibit SAI-5 illustrates those organizations. SAIC serves its clients through a matrix organization, drawing resources from throughout the company. Exhibit SAI-6 shows the distribution of responsibilities in both commercial and federal SI activities.

## EXHIBIT SAI-5

**SAIC Segment and Sector Organization Chart**

## EXHIBIT SAI-5 (CONT.)

## SAIC Segment and Sector Organization Chart





## EXHIBIT SAI-6

**SAIC Organizational Structure**

Responsibilities	Commercial	Federal
Strategy and Long-Range Planning	B	B
Marketing and Promotion	B	B
Account Management/Sales	C	C
Contract Review/Approval	C	C
Project Management/Control	C	B
Implementation/Development	C	C
Hardware/Software Acquisition	C	C
Systems Operations	C	C

C = Centralized, D = Decentralized, B = Both

SAIC functions as a decentralized organization. It consists of around 100 profit centers, most of which reside in nine major organizations that SAIC refers to as sectors. Skills for SI projects can be found in many of the profit centers and sectors. The major sectors are:

- Advanced Technology and Analysis Sector  
Steve Rockwood  
San Diego, CA
- Engineering and Information Technology Sector  
Ed Straker  
McLean, VA
- Technology and Advanced Systems Sector  
Don Foley  
McLean, VA
- Information and Technology Systems Sector  
Mark Hughes  
McLean, VA
- Science and Engineering Sector  
Steve Dalich  
San Diego, CA

- Systems Technology and Integration Sector  
John Warner  
San Diego, CA
- Advanced Technology Sector  
John Glancy  
San Diego, CA
- Commercial Technology Sector  
Joe Walkush  
San Diego, CA
- International Medical Information Systems  
Loretta Elliott  
McLean, VA

In support of its SI strategy, as well as to expand its business base in certain niche markets, SAIC has made several acquisitions over the past few years. Current subsidiaries include:

- American Systems Engineering Corporation
- Bull, Inc.
- Hicks & Associates
- Logistic Systems Architects

SAIC has almost 3,250 employees working full-time on SI, with another 550 assigned to specific SI projects on an as-needed basis. This represents 28% of SAIC's total employee count of approximately 13,600. Approximately 92% of those working on SI projects support federal clients.

Historically, SAIC has found that 80% of its federal contracts and 75% of its commercial contracts are the result of responding to Requests for Proposal (RFPs). Because SAIC is responding to RFPs and the competitive environment engendered, this may help explain its moderate margins.

## **7. SI Business Objectives**

SAIC has two primary business objectives and four secondary business objectives for its participation in the SI marketplace. Its primary objectives are to gain revenues from SI and to satisfy customer demands. Its secondary objectives include control of its account base, follow-up sales, follow-up facility management contracts, and the strengthening of its non-SI business.

The selection criteria for SAIC's target markets include:

- Highly visible programs that make a nationally significant difference
- Growth programs, target markets with clear growth potential
- Large, value-added component
- Customer/program knowledge
- Similarity to previous work
- Reasonable risk to SAIC

Although SAIC continues to diversify in response to changing market forces, one constant remains: national security has been and will continue to be a major focus for SAIC. It remains committed to its national security customers and continues to grow and change as its customers' needs change. Several new company acquisitions will help SAIC better respond to changing customer requirements.

One such acquisition, Logistic Systems Architects, greatly expanded SAIC's ability to provide defense logistics support, including automation, information systems, training, test and evaluation, and simulation. SAIC moved into a major new area: providing technical and management support for the demilitarization of the U.S. chemical weapons stockpile. SAIC introduced new lightweight, rugged electronic displays and computers for the military. Finally, SAIC responded to new R&D opportunities in selected defense-related technologies. In FY 1992 SAIC won important contracts in all of these areas.

At the end of FY 1992, SAIC reorganized the company to support its environmental business and other growth areas in the company. The three top officers of the company were given line responsibility for three segments created to run SAIC's business. This will help SAIC to continually adapt as its markets change and to help its employees adapt and find the opportunities inherent in any change.

Last year, SAIC established a new organization to focus its business development efforts in the international and commercial arena under Mr. V.N. Cook. SAIC's five-year plan projects major growth in the four groups, including commercial systems integration, and two operating units that are in this organization. The new organization will foster and direct that growth. Commercial business and international business differ significantly from SAIC's traditional government contracting business. These areas require different business skills, disciplines, and investment approaches, which are under development.

Major FY 1992 contract wins supported SAIC's efforts to diversify into the areas of telecommunications and networks, transportation, space program support, earth sciences, and health care systems and technology. All offer significant new opportunities in the coming year.

SAIC identifies three objectives that guide its activities:

- **Technology leadership:** SAIC was founded on a base of high-technology work, and it continues to pursue this business. More than 60% of SAIC's professional staff have degrees in science or engineering, with 13% holding doctorate and 34% master degrees.
- **Nationally significant programs:** SAIC seeks to participate in highly visible programs that make a difference. This represents a high-risk, high-reward strategy, since one major "crater," even if it is not SAIC's fault, can have an adverse impact on the company's reputation.
- **Employee ownership and participation:** About 80% of SAIC's employees own stock in the company. This encourages many employees to take a more global view of company matters, rather than focus on individual activities.

These business objectives translate into SI objectives by emphasizing the high-technology capabilities of its personnel in solving complex customer problems. These individuals, in taking a global view and calling on extensive available in-house resources, manage the risk inherent in large SI projects.

As noted earlier, SAIC is expanding its presence in niche markets that it has penetrated, rather than penetrating new markets. This further minimizes risk and counteracts the risks associated with undertaking nationally significant programs.

## 8. SI Capabilities Summary

INPUT feels that there are several key staff capabilities required by both commercial and federal SI units. The percentage of the total average staff associated with each of these categories in SAIC is shown in Exhibit SAI-7.

## EXHIBIT SAI-7

**SAIC Systems Integration Staff Distribution**

Capability	Percent
Management, Strategy and Planning	5
Legal Support/Contract Administration	5
Project Management	10
Systems Development/Implementation	30
Hardware/Software Evaluation/Acquisition	20
Hardware Engineering	5
Sales	5
O&M, Administration	20

SAIC has a very broad base of SI capabilities and will continue to be a formidable competitor in the 1990s. This wide range of experience and capabilities will enable SAIC to capture a greater share of the commercial SI market.

**9. Integrated SI Capabilities Evaluation**

For a company that is not well known in the commercial environment, SAIC could bring remarkable capabilities to commercial SI projects. It counts more than 100 companies among its commercial clients, ranging from Aerojet Corporation to Zapata Offshore Company. These clients currently receive products and services other than SI. However, the clients represent an excellent base to which SAIC could sell its SI services.

SAIC has developed successful SI policies and procedures with many of its hundreds of federal clients. As a result, SAIC has become a major participant in the federal SI market. INPUT now expects SAIC to apply this expertise to the commercial market and become a major force there also.

The employee ownership philosophy of SAIC and its decentralization makes each employee an entrepreneur. Combined with SAIC's focus on commercial SI, this has produced numerous commercial SI projects. SAIC's federal SI competitors have been unable to duplicate this success.

SAIC has developed proprietary technologies in several areas that give it a leading edge in bidding on systems integration projects. SAIC has developed strengths with integrated CASE tools (I-CASE), with geographic information systems (GIS), with software for special networking requirements and with hardware and software for UNIX systems. Two areas that INPUT feels will be very important in future work is SAIC's OCR Power Server, which converts text from hard copy to electronic form with unprecedented accuracy, and its family of document and image management systems.

#### 10. SI Strategic Alliances

Exhibit SAI-8a lists the primary capabilities required to deliver SI projects for which SAIC has not developed alliances, and the strength of them within SAIC.

EXHIBIT SAI-8A

#### SAIC In-House Capabilities (No Alliances)

Capability	Strength
Business consulting	H
Design methodology	H
Design/integration	H
Project management	H
Software development	H
Education/training/documentation	M

L = low, M = medium, and H = high strength

Exhibit SAI-8b lists the primary capabilities required to deliver SI projects for which SAIC has developed alliances, and their strength within SAIC. Although SAIC has developed several alliances, it has no formal program for alliances. Alliances are developed primarily for hardware and other products to comply with contract requirements and as a vehicle for poten-

tial opportunity identification. SAIC uses both contract-by-contract and long-term agreements for its alliances. A contract-by-contract agreement protects company proprietary information. Long-term agreements are used for business relationships involving profit-sharing and marketing.

## EXHIBIT SAI-8B

**SAIC In-House Capabilities  
(With Alliances)**

Capability	Strength
Packaged applications software	L
Packaged systems software	L
Standard computer hardware	L
Custom computer hardware	L
Network management operations	M
Service and repair	L
Software maintenance	H

SAIC has developed alliances for communication hardware for which it has no in-house capability.

In bidding on federal SI contracts, SAIC has chosen a variety of teaming partners to suit its needs. For example, on the Composite Health Care System, SAIC chose Digital Equipment Corporation (DEC). This was an obvious choice, since most of the required applications software modules already ran on DEC equipment. For the Department of Veterans' Affairs, SAIC chose Telenet Communications Corporation as its leading subcontractor.

However, SAIC has chosen IBM Corporation for its most strategic alliance. It has worked closely with IBM in both commercial and federal SI projects. It also has a marketing assistance program agreement with IBM and has developed systems software for IBM for the past nine years.

INPUT expects this relationship to continue as SAIC pursues the commercial SI market. However, when it makes more sense to team with other firms, SAIC will not hesitate to do so.

Exhibit SAI-9 shows some current alliances of SAIC and their purpose.

EXHIBIT SAI-9

SAIC Alliances and Purpose	
Company	Purpose
IBM	Hardware and contract vehicles (e.g., MOSAIC)
Sun Microsystems	Hardware and software
Hewlett-Packard	Hardware and software
Xerox	State-of the art document production systems to complement SAIC's capabilities

### 11. SI Marketing Strategy

Currently, SAIC obtains nearly 80% of its commercial SI business from its existing client base, as opposed to only 50% of its federal SI work. INPUT expects this pattern to change gradually, as SAIC increases its pursuit of new commercial SI clients. SAIC will also emphasize those integration components in which it can realize the highest margins, including

- Customized hardware and software
- Consulting, design, and integration
- Custom software development

SAIC applies four selection criteria in deciding which projects to pursue:

- Growth programs: projects that are either large or are likely to grow into large engagements
- Large value-added component: projects that involve much custom design, development, or consulting, and that will result in higher profit margins
- Customer/program knowledge: projects that can be accomplished similarly to other projects already completed by SAIC



- Risk: projects that, for whatever reason, represent a reduced, although not minimal, risk to SAIC

Although SAIC uses typical marketing approaches, including public seminars and direct mail, these are not especially effective. SAIC accomplishes its best marketing through client referrals and direct marketing efforts. Thus, for SAIC, good performance and current project results will yield the most beneficial marketing for the company.

Except for advertising on television, SAIC uses most of the standard methods of promotion for its SI services. SAIC has found public seminars and advertising in trade/industry publications to be only moderately effective; it has found direct mail and advertising in general business publications to be less effective. SAIC finds that word of mouth and client referrals have the highest effectiveness.

The primary competitors for SAIC's SI business are as follows:

Commercial	Federal
Lockheed	PRC
EDS	CSC
Andersen Consulting	EDS
TRW	

## 12. SI Customer Base/Specific Projects

SAIC primarily supports federal clients in its SI activities. In 1992, nearly 90% of SAIC's SI revenues came from the federal market. As indicated earlier, SAIC has taken several steps to position itself and take advantage of commercial SI opportunities.

In March 1989, SAIC won a contract with the Department of Defense to design and implement the medical information system for more than 700 military hospitals and clinics worldwide. The installations will stretch over an eight-year period. The system, now known as CHCS (Composite Health Care System) has been demonstrated in about a dozen hospitals and nearly 100 clinics.

In June 1989, SAIC won the contract to provide a new private data network to the Department of Veterans Affairs. The project, valued at \$200+ million over ten years, is called the Integrated Data Communications Utility (IDCU). SAIC will provide project management, systems integration, and tailored software. Its subcontractor, U.S. Sprint, will provide the network technology, customer premises equipment, transmission manufacturing, and necessary field support.

In October 1989, SAIC acquired Di-Star Medical Systems Corporation, its principal subcontractor on CHCS. It had previously acquired the Software Products Division of Control Data Corporation. Using these two groups as well as other internal resources, SAIC developed its own product line for medical information systems, named "SAIC-Care."

In September 1990, SAIC won a \$31 million contract with the Department of Energy (DOE) to provide ADP support services for DOE's Albuquerque data center. Under this five-year contract, SAIC will operate the data center and provide system and application programming and other ADP support services.

Several SAIC divisions have developed a variety of CALS systems, applying state-of-the-art technologies in data capture, automation, and optical disk storage and retrieval systems.

For example, SAIC performs one of the most visible Navy "core" CALS projects, the Advanced Industrial Management (AIM) initiative. Using optical scanning, SAIC developed a system to merge ship configurations with engineering drawings and technical manuals, and export these technical data to Navy and DoD activities.

In partnership with key hardware and software vendors, SAIC has pioneered a CALS electronic publishing test bed. Located in McLean, VA, this prototype facility will offer comprehensive document management services from document creation through production.

*Information Systems*—In addition to state-of-the-art command, control and information systems, SAIC also developed a sophisticated drug interdiction system. The Joint Maritime Information Element (JMIE) uses powerful workstations to link federal intelligence and law enforcement agencies within a secure environment. A complementary system, SENTRY, will link the U.S. El Paso Intelligence Center to future drug intelligence centers in Latin America, Asia, Europe, and the Caribbean for information exchanges.

In a commercial contract for Xerox in Spain, SAIC created software and integrated an automated results distribution system for the 1992 Summer Olympic Games. With 600 information kiosks located throughout the Olympic venues, the system distributed final scores moments after an event finished.

For the Federal Systems Integration and Management Center, SAIC helps design and integrate computer and data communications systems for a variety of government customers. For example, SAIC provided design support for the National Student Loan Data System of the Department of Education.

Another example of SAIC's efforts to expand into civilian agency federal business is its systems integration program for the U.S. Bureau of Land Management. SAIC is responsible for the conversion of general Land Office Records from land patents issued in the 18th century to optical storage while generating attribute data for the actual on-line queries.

### 13. Summary and Future Directions

In summary, SAIC has effectively penetrated the federal SI market. INPUT expects SAIC to increase its role in this market. However, federal budget constraints and the high level of competition will inhibit SAIC's growth.

INPUT expects the greatest change to occur in the commercial SI market. Although SAIC has established a commercial presence through various specialized products and services, it is just now beginning to pursue commercial SI. SAIC will likely succeed in this market also. INPUT expects that, within three to five years, SAIC will be a more important participant in the commercial SI market.

Most of the company's revenues are generated from the sale of technical services and products to the U.S. government as a prime contractor or subcontractor. Revenues attributable to the U.S. government accounted for 88% of revenues in 1992, 87% in 1991 and 88% in 1990. Revenues increased 11%, 14% and 18% in 1992, 1991 and 1990, respectively.

The revenue mix between the Technical Services and Products segments have been constant at 93% and 7% of consolidated revenues, respectively, over the past three years. Within the Technical Services segment, national security revenues have decreased from 57% of total revenues in 1990 to 53% in 1992, while all other revenues, which include the energy, environment, health, space, transportation and commercial information business areas, increased from 34% of total revenues in 1990 to 40% in 1992. The continued growth in the company's other technical services mirrors the country's shift of priorities and resources from defense programs to environmental, health care and transportation concerns. Although national security revenues declined as a percentage of total revenues, such revenues increased 9% in 1992 and 6% in 1991 and 1990 in spite of declines in the total defense market during these periods. It is expected that the U.S. government will continue to reduce defense spending because of changing priorities, budget constraints and world events. In order for the company to maintain or exceed historical revenue growth rates, it will need to continue to increase its market share in the national security business area or diversify into other business areas.

SAIC plans on doubling its staff and revenue during the next five years. It expects that one-half of this growth will come from integration services as SAIC rides what it expects to be a 15% to 20% growth curve in integration services over the next five years.

## COMPANY PROFILE

---

SHL Systemhouse  
(SHL)**1. Key SI Contacts**

Peter A. Sandiford  
President and Chief Operating Officer  
SHL Systemhouse  
50 O'Connor Street  
Ottawa, Ontario K1P-662  
(613) 236-9734

Dennis B. Maloney  
Executive Vice President  
SHL Systemhouse  
1010 Glebe Road  
Arlington, VA 22201  
(703) 276-0500

**2. Description of Principal Business**

SHL Systemhouse has become an attractive acquisition candidate during 1990. A number of major multinational corporations have demonstrated interest in this talented company.

SHL Systemhouse, Inc. ("Systemhouse") was incorporated in Canada in July 1974. Systemhouse states that its only business is systems integration, which it describes in its 1988 annual report "...as the business of delivering computer and communications systems to meet the specific and unique needs of large organizations. We visualize systems integration as a channel. Technology in the form of computer and communications hardware as well as systems and applications software products, flow through the Systemhouse channel where they are combined through design and a range of implementation services into a full working system for our customers. Ongoing systems management and operation frequently form part of the complete solution organizations are seeking."

Systemhouse does not focus on developing and delivering standalone software products or professional services, but rather fully integrated and operational solutions. The company added a strong micro-system integration capability through the acquisition of Computerland Canada in July 1988 and ComputerGroup plc, a U.K.-based Computerland franchise in August 1989.

Systemhouse's 1989 fiscal year revenues and profits (Sept. 1, 1988 through August 31, 1989) were \$630.8 million and \$15.3 million Canadian dollars. This compares with 1988 results of \$240.7 million and \$5.8 million.

The large revenue increase is primarily a result of the Computerland Canada acquisition. Though profits improved, they have not matched the record 1987 level of \$23.7 million. This is primarily a result of 1988 and 1989 losses in Systemhouse's U.S. operations.

Systemhouse's 1988 revenues were 50% from Canada, 48% from the U.S., and 2% from Europe. Revenues in 1989 were 78% from Canada, 21% from the U.S. and 1% from Europe. Again, the Canadian Computerland acquisition caused the significant change in revenue distribution.

Systemhouse revenues for U.S. systems integration during its 1989 fiscal year ending August 31, 1989 were \$113 million U.S. Exhibit SHL-1 provides a breakdown of these U.S. revenues.

EXHIBIT SHL-1

**SHL Systems  
Integration Revenues, 1989**

Business Component	\$ Millions
Federal	70
Commercial	43
Total	113

Revenues expressed in U.S. dollars

### 3. Systemhouse's Competitive Position

Systemhouse strengths include:

- An excellent reputation with its customers
- A well-developed set of project management techniques and good implementation experience
- A good reputation and experience in selected vertical industries, particularly federal government, state and local government, and wholesale and retail distribution
- Extensive expertise and experience with a wide range of hardware and software, provided from a broad range of vendors

- Expertise in communications and imaging technology, enhanced through acquisitions and alliances

Systemhouse has also demonstrated the ability to grow through cost-effective acquisitions and to manage these acquisitions efficiently.

Examples of Systemhouse's few weaknesses are:

- It is not a well-known company in the U.S. The systems integration business requires a proven record of success. Though Systemhouse has an excellent track record, it is still not well recognized in the U.S., particularly by commercial customers.
- Its business base is dominated by the industries mentioned earlier which, although constituting a viable market niche, do not directly add to its marketing capability in other commercial opportunities.
- Relatively modest revenues and profits preclude Systemhouse from bidding or being considered for the largest (and most profitable) projects. A significant loss in its Washington D.C. operations in 1988 demonstrated the impact that a single large program has on overall company profitability. The company recognizes this, and its recent acquisition and merger strategy will increase its revenue and profit to spread risk over a larger business base.

#### 4. Markets Served

As mentioned earlier, Systemhouse operates in Canada, the U.S., and Europe. Although it claims not to be vertical market-oriented, it is best known for its work on state and local government and wholesale and retail distribution projects. In the U.S., Systemhouse has also become a successful supplier to the federal government, where it has a growing number of repeat projects for the Army, Navy, Treasury, and Social Security Administration. Systemhouse also has experienced significant success in the state of California, where three of its six U.S. branch offices are located.

#### 5. Recent Events

Systemhouse has pursued a very aggressive acquisition program to expand its capability and accelerate its growth. Among its major acquisitions are:

- In April 1986, Systemhouse acquired Capital Systems of Alexandria Virginia for \$7.5 million. Systemhouse gained 285 employees, \$10 million in backlog, and access to the U.S. Departments of Treasury, Health and Human Services, and Transportation, and the Army and Navy.

- In February 1987, Systemhouse acquired the federal systems division of Yipcon Corporation of Fairfield, New Jersey for \$4.4 million in cash.
- In September 1987, Systemhouse established a wholly owned European subsidiary, SHL Systemhouse S.A. in Geneva, Switzerland. This subsidiary is responsible for systems integration activities outside of North America. In June of 1989, its European headquarters was moved to London.
- During 1987, Systemhouse acquired two additional Canadian firms, DDC Consultants of Edmonton, Alberta and DPLA of Montreal, Quebec and a U.S. firm, ICT of Burlington, Massachusetts that has expertise in optical disks and image processing.
- During 1988, Systemhouse purchased GSA of Quebec to expand its capability in that province and Rand Information Systems, a northern California firm, to expand its presence in California and provide data conversion capability to all Systemhouse branches.
- The most significant investment by Systemhouse in 1988 was the acquisition of Computerland Canada in July. Computerland provides Systemhouse with 70 business solution centers in 55 locations throughout Canada. These centers are described by Systemhouse as much more than retail stores, and expand its microcomputer-based systems integration capacity significantly.
- As of August 31, 1989, the company acquired ComputerGroup plc, the largest franchisee of Computerland Corp. in the United Kingdom.

During the second quarter of 1988, Systemhouse entered into a five-year teaming agreement with Chicago-based Ameritech to work cooperatively on the development of systems integration opportunities in the five-state region where Ameritech provides telephone service. It is anticipated that this agreement will result in over \$100 million of revenue. This agreement also includes the licensing of Systemhouse's proprietary Systems Integration Life Cycle Methodology (SILC) to Ameritech for \$12 million.

In the first quarter of 1990, Kinburn Technology, a unit of Kinburn Corp. and SHL Systemhouse's parent, announced that it could not repay outstanding debts of about \$700 million. To satisfy its debtors, Kinburn Technology has offered to sell or transfer ownership of its 50.1 percent interest in SHL Systemhouse.



Systemhouse would appear to be an excellent acquisition for companies that want to participate in the rapidly growing SI market.

#### 6. SI Organization

Systemhouse has a simple U.S. organization that is project management-focused. The organization consists of six branch offices and National Systems, that report to the President of Systemhouse, Inc, Dennis Maloney. Mr. Maloney, located in Washington D.C., reports to the president of Systemhouse, Peter Sandiford. Each of the branch offices has geographic responsibility for SI projects and operates as a profit center. The U.S. organization is depicted in Exhibit SHL-2.

Branch offices are located where the majority of Systemhouse's clients are located—in California, the Washington-Baltimore corridor, and the Chicago region. Systemhouse will establish new branch offices and profit centers as the quantity of work grows in other geographic areas.

## EXHIBIT SHL-2

**Systemhouse U.S. Organization**

President  
SHL Systemhouse  
P. Sandiford

President  
Systemhouse, Inc.  
(U.S. Operations)  
D. Maloney

Branch Offices

— Washington, DC

— Baltimore, MD

— Chicago, IL

— Sacramento, CA

— San Francisco, CA

— Los Angeles, CA

Based on INPUT's interviews with Systemhouse, responsibilities are distributed as shown in Exhibit SHL-3.

EXHIBIT SHL-3

**Centralization/Decentralization of  
Business Functions  
Systemhouse**

Responsibilities	Commercial	Federal
Strategy and long-range planning	B	B
Marketing and promotion	B	B
Account management/ sales	D	D
Contract review/approval	B	B
Project management/ control	D	D
Implementation/development	D	D
Hardware/software acquisition	B	B
Systems operations	N/A	N/A

C = Centralized, D = Decentralized, B = Both

This exhibit demonstrates Systemhouse's decentralized organizational focus, with branches involved in all business functions and with centralized support in the areas of strategy and long-range planning, marketing and promotion, contract review and approval, and hardware and software acquisition.

Systemhouse has approximately 3,100 employees doing systems integration work worldwide. Approximately 750 of these employees are involved in U.S. operations. Exhibit SHL-4 shows how these resources are distributed.

## EXHIBIT SHL-4

**Distribution of SI Personnel  
Systemhouse**

Capability	Percent
Management, strategy, planning, marketing	5
Legal/contract administration, finance	5
Project management and administration	10
Design/development/implementation	40
Hardware/software evaluation/acquisition	20
Hardware engineering	10
Sales	10

**7. SI Business Objectives**

Systemhouse wants to continue to grow at over 30% and achieve net profits that exceed 10%. It is attempting to achieve these goals by focusing on systems integration as its only business. By investing in relationships with technology suppliers and in technology evaluation and training, the company has positioned itself to meet its key business objectives. These objectives are to provide its customers with the best possible technical solutions and to increase its revenues and profits.

Account control and follow-on hardware sales and facilities management contracts are secondary business objectives.

**8. Internal SI Capabilities Evaluation**

Fundamental to Systemhouse's business strategy is its proprietary Systems Integration Life Cycle methodology (SILC), which the company continues to refine and enhance. Systemhouse is currently on Version 6 of this methodology which it believes leads the industry by at least two to three years.

Each employee receives and must sign for a set of ten or so volumes that describe each of the elements of the SILC methodology. The books address how to approach each of the elements of defining and imple-

menting a system solution. SILC goes well beyond traditional system development methodologies, encompassing not only the software development cycle, but also project management, strategic planning, facilities engineering, quality assurance, architecture definition, capacity planning, and other disciplines essential to successful systems delivery.

The methodology is well-conceived, practical, and uses the most advanced tools, including CASE and modeling techniques.

Although there is a certain amount of mystique regarding SILC, INPUT believes that it is the result of a significant investment in methodology that will provide Systemhouse with a competitive advantage. It provides a set of tools that lead the industry, results in efficient implementation, on time and within budget, and significantly reduces the risk of major failure.

#### **a. Business Consulting**

Though the SILC methodology includes business consulting, INPUT believes its focus is on capturing current requirements and processes so that technology can be applied to automate them. It is not business consulting from the perspective that results in fundamental business process change. Systemhouse does not have strong vertical industry knowledge and depends on the customer for industry business process knowledge. Though this is not a serious obstacle, it may preclude Systemhouse from bidding on some SI opportunities where the customer requirements include business consulting and business process change.

#### **b. Design Methodology, Design and Integration, Project Management, Software Development, and Education, Training and Documentation**

These SI elements are all included in the SILC methodology described above and Systemhouse receives very high marks for these capabilities. Systemhouse has told INPUT that it prides itself in its ability to develop and maintain highly qualified project managers. The company indicates that its personnel policies are designed to retain project managers, many of whom have over 15 years of experience.

#### **c. Packaged Application Software**

Systemhouse chooses not to develop packaged application software, but rather prefers the option to select the best available packages in the market to meet the needs of the current SI engagement. Its parent, Kinburn Technologies, was unsuccessful in the software business and has discouraged Systemhouse from investing in the development of application software packages.

#### **d. Packaged Systems Software**

As with applications software, Systemhouse prefers to select the best available hardware and software for the current SI engagement and not to be biased by a limited set of software and hardware vendor relationships. It has relationships with most leading fourth-generation software vendors.

#### **e. Standard Computer Hardware**

Systemhouse has no hardware products of its own. It has relationships and experience with most leading hardware vendors' equipment, including, but not limited to, DEC, IBM, HP, Wang, and Tandem. Its recent acquisition of Computerland Canada, and Computer Group PLC., will expand these relationships significantly in the microcomputer area.

#### **f. Custom Computer Hardware**

Systemhouse does not develop custom computer hardware.

#### **g. Network Management and Operations**

Though Systemhouse has strong ties with Ameritech, it does not participate independently in the network management and operations market.

#### **h. Service and Repair**

Systemhouse depends on hardware manufacturers for hardware service and repair.

#### **i. Software Maintenance**

Since Systemhouse does not develop system or application software packages, its software maintenance capability is limited to custom software repair and enhancement.

#### **9. SI Strategic Alliances**

Systemhouse has strong relationships with a variety of hardware and software vendors that are described in Section 8. These include, but are not limited to, hardware vendors Digital Equipment, IBM, Hewlett-Packard, Amdahl, and Wang, and software vendors Oracle and Relational Technologies in data base management systems and Cognos and Applied Data Research in fourth-generation languages. Northern Telecom, another Canadian vendor, is a sound and logical choice for a communications partner. Exhibit SHL-5 summarizes these alliances.

## EXHIBIT SHL-5

**SHL Systemhouse  
Strategic Alliances**

Hardware	Digital Equipment IBM Hewlett-Packard AMDAHL Wang
Systems Software	ORACLE Relational Technology COGNOS Applied Data Research
Telecommunications	Northern Telecom Ameritech

As mentioned earlier in this report, Systemhouse has also established a five-year alliance with Ameritech to provide systems integration services to the five-state region where Ameritech provides communications services. This alliance has proved successful and several contracts have been won and are being implemented.

**10. SI Capabilities Summary**

Overall, Systemhouse has a strong set of system development and implementation skills, built around its proprietary SILC methodology. It intentionally lacks packaged application and systems software, standard and custom computer hardware, and communications hardware capabilities. It has established a broad set of alliances with hardware and software vendors to provide those elements it lacks. It uses these relationships to select the best set of components to satisfy the needs of each systems integration opportunity.

**11. SI Marketing Strategy**

Systemhouse's marketing is built around excellence in a single business—systems integration. To support this strategy it has developed a broad set of technical skills and its proprietary Systems Integration Life Cycle methodology. The company offers its services to any market that demonstrates a genuine need for systems integration services. It will

respond to RFPs and leverage its previous success in existing accounts. It will add new branch offices to service new geographic areas when sufficient business is generated.

- **Competitors**—Systemhouse considers Andersen Consulting and EDS to be its major competitors in the U.S. commercial market. It also recognizes other “Big Eight” accounting firms and hardware manufacturers as additional commercial SI competition. It has identified EDS, CSC, Andersen Consulting, and IBM as its major competitors in the federal arena.
- **Positioning**—Systemhouse indicates that its strategic focus is on federal government, state and local governments, wholesale and retail distribution markets, and telecommunications and imaging opportunities. The firm does not focus on specific vertical markets, but rather on opportunities where it can leverage its methodology and technology expertise to satisfy an integration requirement.

Its strategy also includes leveraging applications installation experience. An example of this successful approach is the company's ten successive awards for welfare eligibility systems in state governments.

- **Promotion**—Systemhouse does limited, if any, formal promotion in the U.S. market. It relies solely on referrals of satisfied customers and claims that this “word-of-mouth” promotion has been highly successful. However, the company has recently indicated that it will add a vice president of marketing.

## 12. SI Customer Base

Systemhouse has successfully completed a significant number of commercial and federal SI projects. Examples of some of these programs are depicted in Exhibit SHL-6.

Systemhouse performed on additional programs that include welfare eligibility systems for Arizona, Idaho, Utah, Alaska, Kansas, Wyoming, South Carolina, Montana, Kansas, and Washington. Commercial systems integration projects include a retail product tracking system for Actmedia, Inc., an ISDN networking system for McDonald's corporate headquarters, a billing verification system for U.S. Sprint, and a central customer interface system for GTE. Federal programs included a DEC VAX-based planning, programming and budgeting system for the U.S. Navy, an on-line image-based tool cataloging system prototype for the Defense Logistics Agency, and an on-line Social Security Entitlement Program for the Social Security Administration. Among its projects with its new partner, Ameritech, is a public safety communications system for Marion County, Indiana.



## EXHIBIT SHL-6

### Examples of Systemhouse's SI Programs

Company/Industry	Project Description	\$ Millions
State of California	Student financial aid	5.2
State of California	Courts case tracking	6.0
Hawaii Dept. of Social Welfare Eligibility	Welfare eligibility	4.1
Columbus/Franklin County Library	Support system	2.8
Chrysler Corporation	Quality assurance system	N/A
State of Pennsylvania	Liquor point-of-sale system	N/A
CONTEL	Service control and dispatch	N/A

### 13. Summary and Future Direction

Systemhouse's strength is built around its methodology, SILC, and its ability to manage the application of technology to identified business problems. It has the ability to understand and manage many technologies from many vendors.

Systemhouse promotes itself as a vendor that is not wed to a particular vendor's hardware or software. This allows it to develop and propose a solution that is objective and not biased by the limited product offerings of any single or limited set of vendors.

Systemhouse has an excellent reputation among its customer base. This reputation has proven effective as a reference to acquire new clients and to establish alliances with a large number of important hardware and software vendors.

The alliance with Ameritech provides Systemhouse with a source of new clients and additional revenue and profit growth. It also provides it with a partner to strengthen a weakness in the networking area.

Systemhouse needs to continue to expand its presence in the U.S. market. Its current six branch office network somewhat limits its ability to do this.

Systemhouse's affinity for developing vertical-industry knowledge and applications software packages may preclude it from succeeding in an important segment of the systems integration market. This is the segment in which the customer is looking for business consulting as a means to change some of the fundamental business processes within the enterprise. INPUT believes that this set of customers will ultimately look to the same business consultants, if they are integrators, to implement the recommended change through an SI contract.

Finally, INPUT believes that Systemhouse, based on its commitment to excellence and continued investment in SI methodology, will continue to enjoy success and be an important player in the U.S. systems integration market.

## COMPANY PROFILE

### STM Systems Corporation

#### 1. Key SI Contacts

Amnon Zohar  
Vice President, Central Region  
STM Systems Corp.  
393 University Avenue  
Toronto, Ontario MSG 249

Mr. James Over (Federal SI)  
Vice President, Federal Region  
STM Systems Corp.  
393 University Avenue  
Toronto, Ontario MSG 2H9

#### 2. Description of Principal Business

Formed late in 1988 by the consolidation of two companies previously acquired that year, STM Systems Corp. (STM) is a wholly owned subsidiary of International Semi-Tech Microelectronics, Inc. of Hong Kong. The company is dedicated to providing clients with total solutions for their information needs. These solutions include: systems integration; consulting, systems development, education and training, and professional services; data capture, computer output imaging, facilities management, remote computing, and network processing services; and application software products. STM has been in the federal SI business for two years and the commercial SI business for one year.

In its larger operations, STM is Canada's largest provider of IBM-based processing services, with processing centers in Ottawa, Toronto, and Mississauga in Ontario, Winnipeg in Manitoba, and Calgary in Alberta.

STM's estimated total and SI revenues for fiscal years 1988 and 1989 are presented in Exhibit STM-1.

STM Systems Corp. estimates that the growth rates in the commercial and federal SI markets are 15% and 30%, respectively.

EXHIBIT STM-1

#### STM's Estimated Fiscal 1988 and 1989 Revenues

Revenue	1988 (\$ M)	1989 (\$ M)
Total Corporate	200	210
SI Only		
Federal SI	0.5	15.5
Commercial SI	—	3.0

### 3. Competitive Position

In addition to its financial strength, STM gains its primary advantage from its proprietary systems development life cycle (SDLC) and STM project management methodologies, its strategic business planning methodology, its specialized financial and career planning support software, and its offering of microcomputer-based integrated hardware and software solutions featuring Apricot and STM microcomputers.

STM is a niche-market participant in the overall SI marketplace, offering only those products and services that it can profitably support. STM currently chooses not to offer packaged system software, custom computer or communications hardware, or follow-on services such as equipment service and repair.

STM appears to make good use of alliances. Its alliances support areas in which STM's in-house capabilities need to be enhanced and areas where in-house capabilities are strong, but need to be supplemented for a particular contract to meet delivery commitments.

### 4. Markets Served

STM is functionally oriented. It specializes in providing solutions in the following areas:

- Corporate systems
- Office automation systems
- Administrative systems
- Specific application systems

Its customer base includes both federal and commercial customers, though its major penetration to date has been with Canadian federal agencies such as National Defence, Labour Canada and Finance Canada.

### 5. Recent Events

In 1989, in a major diversification, STM's parent company acquired the Singer Sewing Machine Company (SSMC) for \$220 million, thereby also acquiring SSMC's 30,000 dealers in 100 countries.

Over the past two years, STM has completed the acquisition of several information processing and professional services companies with special expertise in health care, relational data base management, and systems integration. As a result, STM has gained strength as a competitor in the SI marketplace.

## 6. SI Organization

STM's management organization is best described as matrixed. The responsibilities for SI are fully decentralized, as is shown in Exhibit STM-2.

EXHIBIT STM-2

### Centralization/Decentralization of SI Business Functions at STM

Responsibilities	Commercial	Federal
Strategy and long-range planning	D	D
Marketing and promotion	D	D
Account management/sales	D	D
Contract review and approval	D	D
Project management/control	D	D
Implementation/development	D	D
Hardware/software acquisition	D	D
Systems operations	D	D

(D = Decentralized)

## 7. SI Business Objectives

In addition to responding to customer demands, STM identified the pursuit of revenue/profits from SI work and control of its account base as its principal motivations for engaging in SI activities. Secondary objectives were follow-on hardware/software sales and facilities management contracts, and strengthening of its non-SI business.

INPUT notes that reports in the public media suggest that James Ting, holder of the controlling interest in ISTM, Inc. (STM's parent company) is a shrewd investor who can be expected to keep STM focused on its profitability.

## 8. SI Capabilities Evaluation

STM offers SI products and services in the areas of its special expertise and in the functional markets previously identified.

STM ranked its SI capabilities as strongest in the areas of technology expertise and maintenance of its client relationships. In STM's own view, its capabilities in the areas of vertical industry expertise and risk/capacity and project management were areas of less strength. STM uses

alliances in a number of business areas, either to complement a weak area or to buttress a strong area in which delivery requirements need to be supplemented, as shown in Exhibit STM-3.

STM does not claim any capability in the areas of providing packaged system software, custom computer hardware or communications hardware, or equipment service and repair.

INPUT notes that STM is not presenting itself as a management consulting/professional services organization; rather, it is presented as a technologically based applications development and systems operations company.

EXHIBIT STM-3

### STM's SI Capabilities

SI Capability	Strength (High/Medium/Low)	Alliance (Yes/No)
Business consulting	Medium	No
Design methodology	High	No
Design/integration	High	No
Project management	Medium	No
Software development	High	Yes
Education/training/documentation	Medium	Yes
Packaged applications software	Medium	Yes
Standard computer hardware	Low	Yes
Network management/operations	High	No
Software maintenance	Low	Yes

### 9. SI Strategic Alliances

STM uses alliances on a contract-by-contract basis. STM uses its alliance partnerships to support its SI business in the following areas:

- Provision of specialized technical expertise
- Provision of off-the-shelf hardware and software
- Provision of hardware and software maintenance
- Provision of training services

A sample of STM's strategic alliances and their purposes are shown in Exhibit STM-4.

## EXHIBIT STM-4

**A Sample of STM's Strategic SI Alliances**

Alliance With:	Purpose
DEC	Hardware/software maintenance/training
HP	Hardware/software maintenance/training
Unisys	Hardware/software maintenance/training
NCR	Hardware/software maintenance/training
FMCON	Tempest products services
Apricot	Distribution rights to hardware/software

**10. SI Capabilities Summary**

STM's selection of SI capabilities make it a niche player in the overall SI services market. Choosing to offer only those technological function-oriented products and services with which it can profitably compete, STM has buttressed its selected capabilities with alliances that potentially make it more responsive, rather than broadening the scope of its SI offerings.

Exhibit STM-5 summarizes INPUT's assessment of STM's SI capabilities.

## EXHIBIT STM-5

**INPUT's Evaluation of STM's SI Capabilities**

Strengths	Weaknesses
Proprietary methodologies SDLC and strategic business planning Proprietary project management methodology Specific industry software Financial and career planning Complete hardware/software solutions in OA, etc.	Follow-on services Custom computer hardware

**11. SI Marketing Strategy**

STM's marketing strategy is focused on the following specific business functions: corporate systems, office automation, administrative systems,

and other application areas where specific opportunities arise. Clearly, STM has been concentrating more on the application of technology to clients' needs than on the requirements of a total vertical industry.

- Competitors - STM's competition in both commercial and federal SI markets is shown in Exhibit STM-6.
- It is interesting to note that nearly all the same vendors compete in the commercial and federal SI markets and that SI alliance partners compete within the same market also.
- Positioning - STM positions itself as a total solutions provider, offering a cradle-to-grave capability. It understands the need for life cycle support, and has the financial stability to assume the risk of a systems integrator. The corporation presents itself as having objectivity with respect to recommending and providing technological solutions. Its use of alliances increases its responsiveness rather than the scope of its capabilities.
- Promotion - STM relies most heavily on word-of-mouth client referrals. It only uses advertising in general business and trade/industry publications.

STM's total decentralization dictates that marketing of its SI services be a field responsibility. SI projects represent an attractive market for STM's services and proprietary products.

EXHIBIT STM-6

**STM's Competition in SI Markets**

Commercial Sector	Federal Sector
Andersen Consulting	Andersen Consulting
DEC	DEC
DMR	DMR
EDS	Litton Systems
IBM	SHL Systemhouse
LGS	
SHL Systemhouse	

**12. SI Customer Base**

STM, as a new entrant into the SI marketplace, has undertaken approximately half a dozen SI projects, ranging in value from an average of \$1 million in the commercial sector to \$16 million in the federal sector.



STM is pursuing increasingly larger projects with higher total project values.

Some examples of STM's SI projects and customers are presented in Exhibit STM-7.

EXHIBIT STM-7

### Examples of STM's SI Projects

Customer	Project Description	\$ Value
Finance Canada	Corporate systems network	11.1 million
Labour Canada	Integrated data system	2.3 million
Supply & Services Canada	Integrated office system	300 Thousand
National Defence	Canadian forces career information system	N/A
Multiple-Organ Retrieval Exchange	On-line organ availability system	1.3 million

### 13. Summary

STM is particularly strong in areas of technological expertise based on proprietary methodologies. Areas of strength include: SDLC, strategic business planning, and project management. Also, being an integral part of one of Canada's largest providers of IBM-oriented processing services enhances its economic strength and industry credibility.

Its weaknesses include choosing not to offer follow-on services such as equipment service and repair, or communications equipment or custom computer hardware.

It is too early to project STM's future in the SI marketplace; however, INPUT expects it to grow rapidly in its chosen markets.



## COMPANY PROFILE

---

### Technology Solutions Company (TSC)

#### 1. Key SI Contacts

Albert D. Beedie, Jr./Chairman, President and CEO  
Melvyn Bergstein/Vice Chairman  
Technology Solutions Company  
205 North Michigan Avenue  
Suite 1500  
Chicago, IL 60601

#### 2. Description of Principal Business

Technology Solutions Company (TSC) provides solutions to businesses by offering a comprehensive package of services and resources necessary to design, develop and implement major computer systems projects for large corporate clients. These systems are designed to improve operating efficiency, reduce cost and create opportunities for increased profits for the company's customers. In addition, the company sells custom-designed applications software packages and acts as a value-added reseller of computer hardware.

Systems integration services have been provided to the commercial market since the company began operations in June, 1988.

#### 3. TSC Competitive Position

TSC competes with and faces potential competition from a number of companies that have significantly greater financial, technical and marketing resources and, given the company's brief history, greater name recognition than TSC.

The company believes that it has competitive strengths in a number of areas.

- Unlike many larger competitors, it focuses exclusively on systems planning and implementation as its primary business function.
- TSC encourages client involvement in all phases of a project and is able to take a flexible approach toward client problems.

- It heavily emphasizes the need for hiring experienced staff, especially in the area of project management.

#### **4. Markets Served**

TSC is organized into industry-specific practice areas to better focus on the needs of its clients and develop the skills of its employees. TSC presently has three industry practice areas: Consumer Products, Manufacturing, and Financial Services. The multiple practice area structure is utilized largely because of the benefits that clients derive from specialized systems knowledge and software.

#### **5. Recent Events**

TSC launched a public offering of 3,800,000 shares of common stock on September 20, 1991. The principal purposes for this initial public offering were to create a market for the company's common stock, enhance the company's visibility in its industry, and increase the company's equity capital to facilitate expansion of its business and its ability to pursue and secure very large systems projects.

TSC hired former Computer Sciences Corporation executive Melvyn Bergstein as its executive vice president in September, 1991. In October, 1991 he was promoted to Vice Chairman and named to the Board of Directors. Mr. Bergstein will work initially in the company's Consumer Products Division. TSC hopes that Mr. Bergstein will help the company break into larger systems integrations deals.

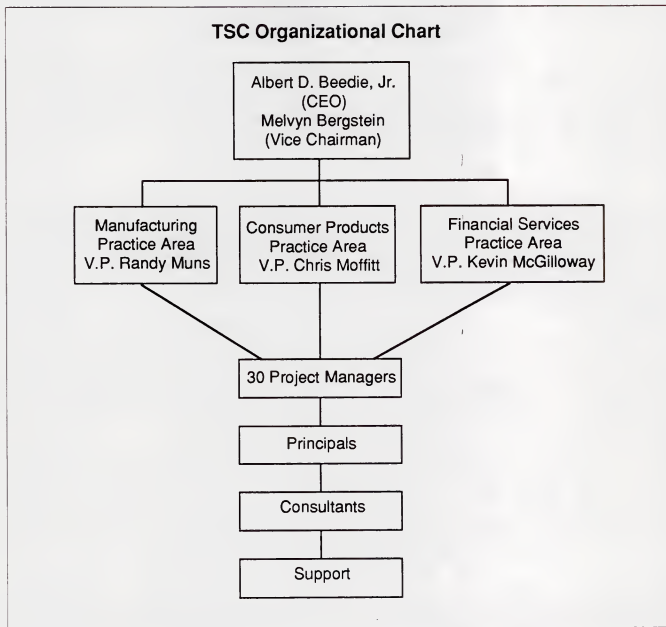
#### **6. TSC Organization**

As mentioned before, TSC is organized by three industry-specific practice areas. TSC believes its practice area approach helps it avoid excessive bureaucracy, enhance creativity and initiative and streamline decision making. The organization of TSC was designed to be very flat and eliminate unnecessary layers of management. The company's founder, Al Beedie, is very concerned with keeping senior management in touch with its consultants.

In time, TSC may expand beyond its three industry practice areas into other areas such as public utilities. As practice areas grow, TSC intends to subdivide them into different specialties within an industry to better focus on particular clients' needs.

Exhibit TSC-1 provides a summary of key organizational units and contacts within TSC.

## EXHIBIT TSC-1

**7. SI Objectives and Revenues**

1991 revenues for the fiscal year ending May 31, 1991 were approximately \$52 million. Approximately 80% of TSC's revenues are derived by acting as a prime contractor. The remaining 20% are derived from subcontracting opportunities. TSC estimates that more than 90% of 1991 revenues stemmed directly from systems integration projects.

The company expects continued growth in the commercial sector of about 19% over the next five years. TSC reports a before-tax margin of 21% on its systems integration business and has continued to show increasing margins since it began operation in 1988.

TSC realizes the greatest margins in the areas of consulting and design, software development, software packages, training and education, and project management. The areas of standard hardware and software, customized hardware and software, and post-installation operations produce lower margins.

### 8. Internal SI Capabilities Evaluation

The company currently has approximately 300 people assigned to support systems integration activities. Of the total personnel supporting systems integration activities, 40% are associated with systems development and 30% are associated with project management. Exhibit TSC-2 shows the distribution of SI staff capabilities.

EXHIBIT TSC-2

#### Distribution of Staff Capabilities

Capability	Percent
Management, Strategy and Planning	5
Legal Support/Contract Administration	5
Project Management	40
Systems Development/Implementation	30
Hardware/Software Evaluation/Acquisition	10
Sales	10

Regardless of organizational structure, many of the responsibilities and activities required to manage and execute an SI contract within a company are matrixed. TSC predominantly follows a decentralized structure for management, administrative, and marketing functions as well as in its core business elements. In the area of contract review and approval, the company has opted to maintain central control.

## 9. SI Strategic Alliances

TSC does not have a formal program for alliances. When forming alliances, the company prefers to form them on a contract-by-contract basis. For example, TSC has collaborated with IBM's Chicago Systems Division to jointly secure two separate projects on which TSC is currently a subcontractor to IBM.

## 10. SI Marketing Strategy

TSC's business development efforts are based primarily upon personal contacts, the reputations of TSC and its senior project managers, a direct marketing program, attendance at appropriate industry conventions, and public relations.

TSC secures engagements from existing clients, former clients and prospective clients targeted by TSC's senior personnel. Formal proposals are also an important part of TSC's business development efforts.

## 11. SI Customer Base

The company has been providing systems integration services for three years, and has provided services to over 30 companies since its inception. As mentioned earlier, the company is organized into three industry-specific practice areas: Consumer Products, Manufacturing, and Financial Services. Revenues generated by each area were 47%, 45% and 8%, respectively, of the company's total revenues. The following are examples of systems integration clients in each of the three practice areas:

- Consumer Products
  - Whirlpool Corporation
  - Michigan Bulb Company
- Manufacturing
  - Northrop Corporation, B-2 Division
  - Westinghouse Electric Corp., Electric Systems Group
- Financial Services
  - Fidelity Investments
  - The Equitable

## 12. Summary and Future Directions

TSC has just completed a very busy year in its short history. In addition to turning to the public with a stock offering for an infusion of cash, it recruited Melvyn Bergstein from CSC as Vice Chairman. These moves—when coupled with the aggressive posture that TSC's founder,

Al Beedie, has maintained from the start—show that TSC is a company going beyond its professional services roots anchored in the financial community to become a broad-based systems integration company looking for larger projects to manage and implement.

By concentrating on three industry sectors, TSC can be assured of better penetration, with the opportunity for larger contracts as its staff increases. TSC appears to be a healthy competitor ready to take on the larger competitors in the systems integration arena. It should be able to expand its base of clients easily in the consumer products area and the fast growing financial areas. TSC's manufacturing business, which has a high percentage of clients in the aerospace and defense industries, may be more vulnerable than the other business areas unless it can find a way to diversify into the commercial market.



## COMPANY PROFILE

---

TRW

### 1. Key SI Contacts

Mr. Timothy W. Hannemann  
Executive Vice President and General Manager  
TRW Space and Defense  
One Space Park  
Redondo Beach, CA 90278  
(310) 812-1030

Mr. John P. Stenbit  
Vice President and General Manager  
TRW Systems Integration Group  
One Federal Systems Park Drive  
Fairfax, VA 22033-4411  
(703) 968-1000

Mr. D. Van Skilling  
Executive Vice President,  
TRW Information Systems and Services  
1900 Richmond Road  
Cleveland, OH 44124  
(216) 291-7000

Mr. Phillip Trapp  
President  
TRW Financial Systems  
2001 Center Street  
Berkeley, CA 94704-1204  
(510) 704-3000

### 2. Description of Principal Business

TRW provides high technology products and services to the space, defense, automotive, and information services markets. TRW employs about 73,000 people. TRW Systems Integration Group has approximately 6,600 employees and TRW Financial Systems has about 400.

TRW reports business activities for three core businesses: Space and Defense, Automotive, and Information Systems and Services. The Space and Defense sector provides advanced technology products, services, and systems management capabilities focused on high-priority national programs. The Automotive sector develops components and systems such as

passive restraint systems. The Information Systems and Services sector includes consumer and commercial credit reporting, real estate information services, and information systems engineering. The Information Systems sector covers the commercial markets for TRW.

Net sales for TRW in 1991 were \$7.9 billion, with international sales accounting for \$2.5 billion or 32 percent of that total. Automotive represented 51 percent of total sales or \$4.02 billion; Space and Defense represented 39 percent or \$3.11 billion; Information Systems and Services represented 10 percent or \$770 million.

TRW's new Systems Integration Group (TRW SIG), formed under the Space and Defense sector by combining the former Federal Systems Group with two divisions of the Defense Systems Group, provides a wide range of services to the federal government. These services include systems engineering, systems integration, operational and maintenance support, command and control, and information processing.

The four operations divisions of TRW SIG are shown in Exhibit TRW-1.

EXHIBIT TRW-1

### Operating Divisions

Division	Responsibilities
Systems	Systems Engineering; Develop and install Navy systems and information processing systems.
Command Support	Design, develop, and integrate strategic and tactical command and control systems and security systems.
Systems Development	Integrate and maintain high-technology space and mission support systems.
Systems Engineering and Development	Design, develop, and integrate systems, information management, battlefield automation, and surveillance and control systems for the Army and Air Force.

TRW has contracts with all three branches of the Department of Defense (DoD) and with several civilian agencies. TRW is known for its expertise in the areas of systems engineering and technical assistance (SETA) and special studies.

SIG offers three important core services: systems engineering, software engineering, and systems integration, augmented by a number of technical, operational, and project management specialties.

This division has designed, written, delivered, and supported millions of lines of highly reliable code, much of it written in the increasingly important Ada language. Its Ada Process Model gives the division an unparalleled advantage in the development and use of Ada.

TRW SIG computer-aided software engineering (CASE) methodologies enforce adherence to rigorous standards, ensuring code that reliably meets mission parameters. These tools are unique in that they support the total software development life cycle, rather than addressing only a few phases. By enhancing communication and understanding among all participants, CASE environments result in software development with lower risk, reduced rework, enhanced productivity, and lower cost.

Modern information and communications systems often comprise components from many sources: customer-furnished, commercial-off-the-shelf or non-developmental items, subcontractor-developed, or one-time components developed specifically for the system in question. Ensuring that all these elements work together is the job of SIG.

TRW Information Systems and Services includes consumer and business credit information, direct marketing services, real estate information services, and transaction processing systems. Information and services are provided to businesses, credit-granting organizations, financial institutions, and individual consumers.

TRW Financial Systems, Inc. (TRW FS) is a business unit in the TRW Information Systems Group. TRW bought Teknekron Industries in 1986 and renamed it TRW Financial Systems. Thus, TRW was able to add substantial image processing capability and experience. The division is the main commercial systems integration activity of TRW. TRW FS provides all aspects of imaging, including processing, document processing, credit-card draft processing, and check processing as turnkey products. Other capabilities include nearly all details of integration, operations consulting, functional analysis, operational improvement studies, and product/market evaluation. TRW FS will seek opportunities that capitalize on the company's expertise in technologies such as data base development, neural technology, and management systems.

When TRW bought Teknekron Industries, it acquired an installed base at American Express Travel Related Services Co., Inc., J.C. Penney Company, Core States Financial Corp., and a number of larger financial service companies. More recently TRW has installed systems at Amoco Oil, New Jersey Bell, New York Life, Pacific Bell, Manhattan Bank, and City Bank.

Even though TRW SIG has worked exclusively with the federal government and TRW FS with only commercial clients, they expect to work together in the future in a way similar to their joint proposal efforts to the IRS and the U.S. Postal Service.

However, TRW retains much of its cold war "culture" and is very reluctant to discuss its plans for civilian, federal, or commercial activities.

On August 6, 1992, TRW announced a reorganization of its Space and Defense organization to be effective January 1, 1993. TRW spokespersons stress that the changes are designed to assure that Space and Defense will become even more customer focused for the increasingly challenged space and defense market.

In summary, the organizational changes are shown in Exhibit TRW-2.

EXHIBIT TRW-2

### TRW Organizational Changes

Current	Effective 1/1/93
TRW S&D sector management organization	Discontinued
Four groups report to sector	Direct report to CEO
Electronics Systems Group Space & Technology Group	Space & Electronics Group formed
Avionics & Surveillance group	No change
Systems Integration Group	No change

The translation team will be chaired by Timothy Hannemann (S&D sector to S&E group), with John Stenbit (SIG), Bob Kohler (A&S), Howard Knically (corporate staff), and Jeff Wilkens (S&D staff).

### 3. Company Competitive Position

Historically, TRW's excellent reputation has been based on expertise in the areas of systems engineering and technical assistance (SETA) and on special studies done for the DoD and several civilian agencies. When TRW won the IRS Integration Support Contract (ISC) contract under the Tax Systems Modernization (TSM) project, many other federal systems integration (SI) vendors were surprised. TRW continues trying to leverage its DoD success into other non-DoD and non-federal markets.

To leverage its extensive experience in the DoD command, control, communications, and intelligence (C<sup>3</sup>I) marketplace, TRW built what is called a command systems research and development facility (CSRDF), which operates in an open distributed architecture environment and acts as a test-bed for proposed and evolving command and control systems.

SIG created the CSRDF to address the following issues:

- Increased use of commercial-off-the-shelf (COTS) products and non-developmental items (NDI)
- Use of standardized hardware and software
- Configurations using heterogeneous equipment suites
- Use of Ada for new software development
- Increased use of high-performance hardware and software and high-resolution, graphics-oriented systems
- Integration of knowledge-based decision support systems
- Multilevel security requirements

### 4. Markets Served

TRW SIG targets primarily federal government agencies, industry contractors, and international customers. TRW FS will be targeting opportunities for integration work beyond imaging where price will not be the prime differentiating factor. Together TRW SIG and TRW FS will be targeting opportunities where it can apply its program management skills.

Market areas are shown in Exhibit TRW-3.

## EXHIBIT TRW-3

**Markets**

- Banking/finance
- Federal government
- Financial
- Petrochemicals
- Insurance
- Retail
- State & local governments
- Telecommunications
- Transportation
- Utilities

The applications for these markets are shown in Exhibit TRW-4.

## EXHIBIT TRW-4

**Applications**

- Digital check imaging
- Remittance image processing
- Document processing
- Credit-card draft processing
- Image microstation
- Electronic systems for space and defense
- Scientific and communication spacecraft
- Computer-based information systems

**5. Recent Events of Interest**

TRW won a \$300 million Integration Support Contract (ISC) for tax modernization effort of IRS. Major subcontractors are Electronic Data Systems Corp. (telecommunication support); Price Waterhouse (tax administration and business systems); and Computer Data Systems Inc. (security risk analysis). The subcontractors, with extensive civilian experience, are being used to supplement TRW's military SI experience.

Even though the ISC contract in the \$8 to \$10 billion Tax Systems Modernization (TSM) program has been estimated to be worth between \$300 and \$550 million over 12 years, the initial funding for ISC is \$9.2 million.

On the negative side, the IRS decided not to award the Check Handling Enhancement and Expert Systems (CHEXS) contract to TRW because its sole bid was too expensive and would not give the agency what it wanted. The IRS began the CHEXS procurement in the fall of 1989 and closed the bidding process in May 29, 1990. The IRS had planned on awarding by September 1990. TRW has protested to recover up to \$8 million in bid and proposal costs, and other expenses. TRW is positioning its imaging efforts toward the capture of the larger IRS imaging contract, the \$1 billion Document Processing System.

TRW Systems Integration Group, Carson, CA, was awarded a \$12.3 million USAF contract to develop the U.S. Antisatellite (ASAT) system architecture, including command and control, battle management, and integration, with the Space Engagement Node at The Cheyenne Mountain complex. The competition was against four other contenders.

TRW FS has a contract with NMB Postbank Group in the Netherlands, called giro, for multisite imaging systems to process hard copy financial instruments. The initial contract is valued at over \$25 million U.S.

New Jersey Bell is using TRW's advanced Image Character Recognition (ICR) technology for a large-scale remittance image processing system.

Eurocard Netherlands B.V. awarded to TRW a \$3.3 million contract for design and installation of large-scale, image-based sales draft processing system.

The Boatmen National Bank of St. Louis recently installed an enhanced lockbox image processing system built by TRW.

J.C. Penney Company's Credit Processing Center will use an enhanced TRW remittance image processing system. TRW FS will replace the current image systems with a more advanced image subsystem for remittance handling.

Fidelity Investments Inc. has just signed a contract with TRW FS to design and build an image capture, archive, and retrieval system for all of Fidelity's mutual fund and brokerage product documents. The system will capture and store high-resolution digital images of all documents for subsequent processing.

## 6. SI Organization

TRW Systems Integration Group is composed of four divisions and two subsidiaries. The four divisions are

- Command Support Division
- Systems Division
- Systems Engineering and Development Division
- Systems Development Division

The two subsidiaries are

- TRW Systems Services Company
- TRW Environmental Safety Systems, Inc.

TRW Information Systems and Services is composed of three business units:

- TRW Financial Systems
- TRW Information Services Division
- TRW Business Credit Services

TRW Financial Systems has between 250 and 300 people to apply to commercial SI projects and between 50 and 75 to federal projects. The vendor usually functions as the prime SI contractor.

## 7. SI Business Objectives

TRW SIG's business objectives are as follows:

### a. Systems Engineering

TRW SIG is positioned to advise customers not only on the hardware aspects of a proposed system from design through deployment but also on administrative details from scheduling and configuration management to logistics and operations and management. SIG's experience translates into a systems engineering capability, applicable to projects as diverse as large distributed information networks; command, control, and intelligence systems; building design and construction; and critical environmental technologies.

### b. Software Engineering

TRW SIG has designed, written, delivered, and supported millions of lines of code, much of it written in the increasingly important Ada language. Its Ada language Process Model gives this vendor an advantage in the development and use of Ada.



TRW SIG's computer-aided software engineering (CASE) methodologies enforce adherence to standards, ensuring code that meets mission parameters. These tools support the total software development life cycle, rather than addressing only a few phases. By enhancing communication and understanding among all participants, CASE environments result in software development with lower risk, reduced rework, enhanced productivity, and lower cost.

Because of TRW SIG's experience with Ada and CASE, INPUT expects this vendor to be involved with DoD's Integrated CASE (I-CASE) procurement either as a prime or subcontractor.

### **c. Systems Integration**

SIG customers are motivated to use commercial-off-the-shelf (COTS) and non-developmental items (NDI) because they can buy the function and performance they need without incurring the higher cost, longer schedule, and greater risks associated with custom development. But too often this promise goes unfulfilled as unforeseen problems such as incompatible interfaces, incomplete or inaccurate documentation, or outdated performance specifications disrupt the integration process.

SIG has established its own integration facilities to disclose and resolve the inevitable integration "bugs" that arise in a variety of information systems configurations. Using SIG and vendor-supplied hardware and software, SIG evaluates COTS and NDI and finds and fixes problems before the customer starts paying.

SIG has substantial experience designing, developing, engineering, and integrating complex systems. Clients can expect end-to-end systems integration support based on field-proven knowledge, performed by experienced people with comprehensive tools.

TRW Financial Systems (TRW FS) is positioning itself as the leading systems engineering and integration company that delivers image processing systems with extremely high performance capabilities.

## **8. SI Capabilities Evaluation**

TRW has been a major SI and technical analysis contractor within the federal government. Unfortunately, as successful as these programs have been, many of them are wrapped in a cloak of security because they involved intelligence gathering and intelligence processing. It is very difficult to make an independent evaluation of TRW SIG's capabilities.

Because TRW has historically pursued and captured large government contracts and because of its excessive concern for the sensitive nature of this work, it is INPUT's judgment that this represents a substantial revenue area for TRW SIG.

TRW FS has been a leading image-processing integrator. It uses alliances to acquire packaged application software, packaged systems software, and standard computer hardware to supplement its capabilities for SI. Its greatest strength is in business consulting, design and integration, software development, custom computer hardware, service and repair, and software maintenance.

### 9. SI Strategic Alliances

Like other federal SI vendors, TRW SIG has formed alliances to pursue the Army's Sustaining Base Automated Information Services (SBIS), which is expected to be based on a government-owned and government-operated open system environment (OSE). Members of TRW SIG's team include CSC and Arthur Andersen.

INPUT expects TRW to form other alliances as needed for the opportunities it elects to pursue, such as DoD's I-CASE. Many of these alliances are not strategic but represent teaming for individual programs.

TRW FS designs much of the hardware used in its imagery processing systems. It buys hardware and software where appropriate. Its partners include AT&T, BancTec, Canon, CDC, Data General Corp., IBM, Texas Instruments, and Xerox.

### 10. SI Capabilities Summary

TRW FS will limit its SI activities to the niche market of imagery-based financial systems. TRW is limiting its forays into non-DoD SI to civilian federal activities. Its surprising win at Treasury indicates that the company can transfer its DoD skills to other parts of the government. INPUT believes that TRW FS will substantially increase its activities in other federal civilian agencies.

TRW has a rather large activity on the West Coast providing several commercial software packages. This could lead to additional efforts in the civilian agency and commercial markets.

As long as TRW SIG retains its old cost structure and its cold war corporate culture, INPUT expects it to have limited success in the commercial marketplace.

## 11. SI Marketing Strategy

TRW SIG will continue to rely on the business and marketing relationships that it has developed through its ongoing DoD and federal programs to support its future efforts. The vendor feels that it knows enough other companies and that enough other companies are familiar with TRW to permit its continued success as a federal SI vendor.

TRW FS uses direct mail, with moderate results. It relies on word of mouth, trade shows, and direct sales calls for its marketing.

## Competitors

TRW SIG competes with all major federal system integrators and federal SETA contractors for its DoD and civilian agency contracts.

TRW FS competes in one of the hottest technology areas, imaging. New companies are entering this market each day, each with the newest in imaging technology.

## 12. SI Customer Base

The TRW SI customer base is shown in Exhibit TRW-5.

TRW feels that a success at the City of Chicago and the New York Stock Exchange will help it expand into commercial, industrial, and nondefense government markets.

## 13. Summary and Future Directions

INPUT expects TRW to compete on Request for Proposals (RFPs) from civil agencies such as NASA's earth observing satellite systems data and information system (EOS-DIS) in order to apply its DoD systems integration expertise. To effectively compete in the commercial market, TRW must modify some element of its corporate culture.

If requirements call for SI involving high-performance imagery processing, TRW FS would be a strong potential prime contractor. This autonomous division could serve as a means of entree to other commercial SI activities for TRW.

TRW's west coast activities within TRW SIG may be more ready to pursue commercial business than the east coast operation, which is still a bastion of federal business. This 1,500-person division is ready to pursue commercial SI business supported by commercial products, once it has the requisite corporate approval.

## EXHIBIT TRW-5

**Customer Base**

City of Chicago—Physical security systems and a communications and dispatch center for O'Hare and Midway airports.

DOE—Access control and alarm monitoring system at Savannah River.

DOE—Civilian/radioactive waste management center.

FAA—Services in support of the FAA's Advanced Automation Plan.

Navy Undersea Surveillance Project Office—System engineering and integration support.

NASA (Johnson, Kennedy, Goddard)—Physical security systems.

New York Stock Exchange—Access control and monitoring system.

USAF-SAC—Security for Underground Command Center and Consolidated Space Operations Center.

USAF-ULANA—TRW/EDS awarded contract to install LANs based on federal standards.

TRW has not been very forthcoming with information about its commercial SI integration directions. Years of working with DoD has made the company reticent to discuss any of its commercial integration plans. INPUT recommends that any company that wants to pursue a commercial integration opportunity with TRW should be aware that it still has the mind-set of a DoD-based federal contractor rather than a commercial systems integrator.

## COMPANY PROFILE

---

### Unisys Corporation

#### 1. Key SI Contacts

##### Federal

James McGuirk, President  
Unisys Government Systems, Inc.  
8008 Westpark Drive  
McLean, VA 22101  
(703) 556-5000

Al Zettlemoyer, Acting President  
Paramax Systems Corporation  
8201 Greensboro Drive  
McLean, VA 22101  
(703) 847-3200

##### Commercial

Mr. F. Ronald Jenkins  
Vice President  
Systems Integration Operations  
United States Information Systems  
Unisys Corporation  
PO Box 500  
Blue Bell, PA 19424  
(215) 986-4011

#### 2. Description of Principal Business

Unisys is a lot more than a hardware manufacturer. The company makes and markets computer-based networked information systems, software, and related services on a worldwide basis. Unisys has restructured to provide cost-effective solutions to existing and prospective customers worldwide. At present, nearly 50% of its U.S. revenue is derived from services. The corporation expects strong revenue growth from both outsourcing and systems integration services.

Unisys specializes in providing mission-critical solutions based on open information networks for organizations that operate in transaction-intensive environments, such as banks, insurance companies, airlines, telephone companies, government agencies, and other commercial enterprises with high-volume distribution activities. Unisys' 1991 information systems revenue of \$8 billion places it fifth in North America and eighth worldwide.

One of the largest information technology companies in the world, Unisys employs more than 56,000 people and operates in some 100 countries. Their annual engineering, research, and development expenditures exceed \$1 billion. They receive more than 80% of their revenue from commercial information systems and services, with the remainder originating from custom systems and services from their Paramax Systems Corporation subsidiary. Slightly more than one-half of Unisys revenue derives from operations outside the U.S.

Unisys has been successfully providing information technology and services to the U.S. government for over 40 years, since the first Univac I mainframe system in the government arrived at the Bureau of the Census in 1951.

Paramax Systems Corporation with headquarters in McLean, Va., does about 63% of its business with the Department of Defense (DoD), 16% with civilian federal agencies, 19% with foreign governments and only 2% with state governments. Paramax has goals of 50% DoD business and 25% international business in five years. Paramax estimates revenues of \$2 billion for 1992.

Unisys estimates that 56% of Paramax efforts are in systems integration, 30% in electronic products, and 14% in professional services.

Paramax sells to the federal government using existing computer hardware when appropriate, and providing hardware when necessary to satisfy the client. Unisys Government Systems has the responsibility of selling existing Unisys products and services to the federal government.

### **Principal Products and Services**

Principal information systems products and services include mainframes and peripherals, departmental servers and workstations, software and related services, equipment maintenance, and custom products and services.

Mainframes and peripherals comprise a complete line of small to large mainframe computers and related communication processors and peripheral products such as printers, storage devices and document handling equipment. Departmental servers and workstations include distributed systems, intelligent workstations, UNIX OS-based equipment, terminals, and personal computers. Software and related services consist of application and systems software, systems integration, and related professional and technical services, including consulting and education. Equipment maintenance involves preventive maintenance, the supply of spare parts and other repair activities. Custom products and services include specialized information processing systems marketed mainly to government defense agencies.

Unisys markets its products and services throughout most of the world, primarily through a direct sales force. In certain foreign countries, Unisys products and services are marketed primarily through distributors. Unisys manufactures a significant portion of its product lines. Some products, including certain personal and UNIX OS-based computers, peripheral products, electronic components and subassemblies, and software products, are manufactured for Unisys to its design specifications by other business equipment manufacturers and component manufacturers of software suppliers.

The company has announced a 12-month track record of sustained profitability and profitable 1st, 2nd, and 3rd quarters, FY-92. Net income was 23 cents per share, or \$68.3 million for the 3rd quarter ended September 30, 1992, compared with a net loss of \$75.8 million in the comparable quarter a year ago. The company expects to be profitable for all of FY-92. This is quite a turnaround for a company that lost more than \$1 billion in 1989 and 1990. Following are the costs and expenses for 1989-1991:

Cost and Expenses (\$M)	1991	1990	1989
Operating income (loss)	(578.9)	44.0	(210.2)
Interest expense	407.6	446.7	425.7
Other income (expense), net	(301.8)	65.4	81.6
Loss before income taxes	(1,288.3)	(337.3)	(554.3)
Estimated income taxes	105.0	99.4	85.0
Net loss	(1,393.3)	(436.7)	(639.3)

In 1991, Unisys pursued the public offering of their Paramax Systems Corporation subsidiary. In November, however, they withdrew the Paramax stock offering due to weak market conditions in general and investor uncertainty about the defense industry.

Over the past few years, Paramax has aggressively adapted to a changing defense market while working to expand its business in the commercial electronics and systems integration markets.

Paramax had an excellent year in 1991 and will continue as a positive, profitable part of the business.

### 3. Company Competitive Position

Unisys has a track record of solving critical business problems. Unisys estimates that their systems

- Process half the world's checks
- Move one-third of the world's air cargo



- Handle reservations for 140 airlines
- Help connect 85% of telephone calls in the U.S.
- Provide services to citizens through 1,600 government agencies worldwide
- Power some of the most sophisticated integrated electronics systems used by civil and defense agencies of the U.S. government and its allies

Ongoing programs include the following:

- In Chicago, United Airlines wanted to give its cargo customers—freight forwarders—more control over their shipments on United aircraft. Using MAPPER, a software development tool, they delivered, in just six months, a solution called Cargo Plus 1. The system, which runs on an open UNIX platform, allows freight forwarders to tap into United's central data base to make cargo reservations, track shipments, and complete other tasks in real time—all without having to contact United personnel by phone.
- In the New York City area—the busiest airspace in the world—a sharp increase in aircraft traffic during the 1980s was causing flight delays. The Federal Aviation Administration (FAA) needed to expand an existing air traffic control system used to track flight arrivals and departures at 50 airports in a 70-mile radius. Unisys subsidiary Paramax Systems Corporation led a team of subcontractors in upgrading the system—while in service—with state-of-the-art features. In 1991, the enhanced Automated Radar Terminal System (ARTS) IIIIE went into operation. The new system has doubled tracking capacity and eliminated flight delays due to computer overload.

Unisys is focusing resources on developing, for their chosen markets, “value-added” software solutions and services—those that differentiate Unisys from the competition. These are solutions like their leading edge InfoImage check imaging system, and Network Applications Platform solution for enhancing telephone services, and professional services like new Enterprise Information Technology Planning, which helps organizations apply computer technology to achieve their business plans.

Unisys has particular strength in certain industry segments, such as banking. Emphasis is specifically on interbank networking systems (S.W.I.F.T.), document processing systems and retail distribution systems, transportation (reservation, air cargo), communications (telephone billing), and state and local governments (police information, on-line management systems and court management systems), and the federal government.



#### 4. Markets Served

Unisys is serving organizations that operate in transaction-intensive environments. Their systems excel at processing transactions—in real time. Unisys holds a dominant market position in airline reservations and bank check processing. They generate about 75% of revenue in commercial business from four large, highly transaction-intensive markets:

- Financial services
- Airlines and travel
- Telecommunications
- Public sector

Unisys systems are used by 44 of the world's 50 largest banks; 14 of the world's 20 largest airlines and 140 airlines worldwide; U.S. regional Bell telephone companies and many postal telephone and telegraph agencies overseas; and 1,600 government agencies in the U.S. and abroad.

In addition, the Paramax subsidiary is a leading supplier of complex electronics systems to civil and defense agencies of the U.S. government and allied foreign government agencies. More than 20 different types of Paramax's electronics systems played a role in the success of Operation Desert Storm in early 1991.

Paramax is working to expand its presence in foreign markets, such as Canada. The company is also developing a greater number of products and services for nondefense applications. In addition to air traffic control technology, Paramax supplies advanced weather forecasting systems, software and services for the U.S. space shuttle program, Medicaid claims processing for various U.S. state governments, and automated postal systems for the U.S. Postal Service.

Paramax is in the midst of a major, multiyear program to create a network of up to 175 WSR-88D weather radars (also known as Next Generation Weather Radar) across the U.S. The systems use Doppler radar—an advanced technology that can “see” inside developing storm clouds—to help the U.S. National Weather Service greatly improve the detection of severe weather hazards such as tornadoes.

The Unisys Space Systems operation is in Houston, Texas. The organization was created in 1986 to handle one program—supplying software and services for the U.S. space shuttle program.

Today, Space Systems is working on nine different space programs and satellite contracts. One of its newest wins: teaming with Bendix Field Engineering Corporation on a \$240 million contract to maintain ground stations for the nation's military satellites.

The Unisys InfoImage family of systems automates the processing of paper documents. The systems capture a digitized image of a document. The images can then be processed electronically on computer workstations.

The InfoImage IIPS/ICPS (Image Item Processing System/Image Check Processing System) is at least a year ahead of the competition. Imaging systems are typically defined as part of a system integration program.

Examples of its use include the following:

- Signet Bank dramatically increased the number of checks it processes each hour per employee. The bank has already saved a half million dollars with its new system, and expects to save \$12 million over five years.
- Huntingdon Bancshares uses InfoImage IIPS/ICPS to process all the checks received from its nearly 300 bank offices—about 400,000 items a day. With imaging, the bank expects to speed up check processing by more than 50%, cut labor and training costs, and generate new sources of revenue by offering image check processing to other banks and its corporate customers.
- Comerica Bank is also processing its daily checks using InfoImage IIPS/ICPS and will be the first Unisys customer to return images of checks—rather than the checks themselves—with account statements.

The InfoImage Folder system provides a similar solution for general business documents, such as invoices, mortgages, records, and government forms. It automates the processing, distribution, storage, and retrieval of business-sized documents as well as larger documents, such as engineering drawings. Using the system, employees spend less time looking for information and more time serving customers.

A new suite of InfoImage Professional Services helps organizations turn the promise of imaging into a reality. Unisys works with customers to identify opportunities for imaging and to implement the technology with a rapid return on investment.

Elements of Unisys have participated in the systems integration (SI) business since the invention of the term in the 1950s. As a corporation, Unisys has a high degree of vertical market orientation. Part of the stated strategy of the company in systems integration is to exploit the traditional

lines of business where Unisys has demonstrated strength. In addition, Unisys is pursuing cross-industry opportunities, which would leverage its capability in providing integrated solutions to large network and other infrastructures opportunities. The specific targets for commercial and federal markets are listed in Exhibit UNI-1.

EXHIBIT UNI-1

**Unisys' SI Target  
Market Opportunities**

Commercial Targets	Federal Targets
State and local government	All executive branches
Finance and banking	Department of Defense
Manufacturing/distribution	Independent agencies
Communications and airlines	Judicial and legislative

### 5. Recent Events

Unisys Corporation is one of the top computer vendors in the world and one of the top computer service vendors to the federal government. In this section, INPUT lists some representative Unisys actions during the past years that are illustrative of their efforts in commercial and federal systems integration. Since Unisys does not currently have a separate SI organization, these represent how Unisys uses SI to supplement hardware sales.

Between 1989 and 1992, the proportion of Unisys mainframes has remained roughly stable at about 25% of all mainframes at U.S. sites. But a commitment to open systems, first defined in 1990, will help Unisys expand its installed base.

On July 23, 1992, Unisys secured a major contract for the supply of banking automaton equipment to the Czech Savings Bank. Terms of the \$90 million deal call for Unisys to supply a computerized banking system to the bank, preparing the way for an on-line network in the next few years.

The automated equipment will help the Czech Savings Bank cope with the changing market conditions in the country, particularly the recent reforms in government.

Plans call for two Unisys A16 mainframe computers to drive the network, which will cover most of Czechoslovakia. Unisys will supply a range of hardware and software to interface the mainframes with computers at branch sites.

Since Unisys banking systems are already in place throughout several European countries, it should be possible to link the automated banking system of Czechoslovakia with those of other European countries to simplify the transfer of money between countries.

Also in July, Telecom Corp. of New Zealand Ltd. purchased the Unisys Network Applications Platform (NAP) as the first step in enhancing its soon-to-be deployed Intelligent Network. The value of the contract is approximately \$4.4 million. A major influence in the decision was that the same system is already used by a number of telephone companies around the world.

NAP gives Telecom an advanced development environment in Unisys LINC, and a powerful processor. It provides a common user interface for all the services that customers will receive, and implements X.400 and X.500 protocols to network messages between Telecom's voice-messaging customer base and the rest of the world.

An equivalent of the now widely used PC voice and fax boards, with digital and/or analog interconnections, has been built for large platforms. This provides a much more flexible application development environment for integration with corporate data base repositories. The open nature of this platform allows interfaces with data bases from information suppliers. This means Telecom can provide a comprehensive range of audio text and interactive voice response systems.

Applications for the system will be developed in Wellington by the Unisys-owned systems integration company, SynerCom.

On the first day of July, Unisys was awarded an office systems contract potentially worth about \$340 million to provide hardware and services to General Services Administration offices in the U.S. Although the contract volume is "indefinite," the total value is expected to be worth a minimum of \$338 million.

The GSAS (General Services Administration Systems) contract will involve installation and associated support services for microcomputers and communications equipment. Under the contract, Unisys will provide GSA with a range of hardware and software, including mainframes, microcomputers, laptops, and communications equipment. Unisys will also install and maintain the equipment and train personnel in its use. The

contract provides GSA with a bridge from its current diverse computer environment to one based on an interoperable, agency-wide information architecture. Unisys will provide models from its A-Series line. All systems will run the MCP/AS operating system.

Although there are a number of existing open-ended contracts that GSA could use to obtain equipment and services, this large single contract will make it be easier for the agency to move away from the current hodge-podge of computers and software which includes minis, mainframes, and local-area networks.

Unisys expects to replace its own mainframe in the Washington area, as well as up to 500 network or minicomputer systems to replace Honeywell mainframes, as part of this GSA contract.

The Federal Aviation Administration has hired Paramax Systems Corp. to help upgrade and enhance air traffic control systems across the country.

In March 1992, Unisys launched a set of consulting services that will assist federal agencies and other organizations in applying imaging technology. The Unisys InfoImage Professional Services methodology is designed to educate and assist users during all phases of an imaging project, from planning and development to installation and maintenance. Because implementing an imaging solution is a multistep process, Unisys has designed a suite of services to help meet users' total requirements. Unisys InfoImage Professional Services are intended to help organizations shorten the installation cycle, maximize the return on their investment, minimize startup time, educate end users, and meet end-user expectations.

The InfoImage Professional Services include Pre-Decision Services, which help to clarify opportunities and establish a framework for systems design and installation. Pre-Installation Services consist of using the information gathered in the predecision process and completing a detailed design and communications plan. As installation approaches, Unisys offers Installation Services, followed by Post-Installation Services, which help users integrate imaging technology and cover conversion and support issues. At that point, Unisys Life Cycle Services provide customer education and continuing project management over the project life cycle.

On February 3, 1992, Paramax Systems Corporation was officially created as a subsidiary of Unisys Corporation. This had followed an unsuccessful attempt to sell the profitable \$2.2 billion Defense Systems unit, which started in October 1991.

In December 1991, Paramax Systems Corporation announced that it and five other companies, led by IBM Corporation (Litton, Harris, CSC, TRW, and Scitor), were awarded systems and software responsibilities for competitive procurement for the Command and Data Processing (C&DP) segment of the Air Force Satellite Control Network (AFSCN). Paramax estimates their first-year portion of C&DP will be \$9 million.

On August 9, 1991, Unisys Defense Systems Inc. negotiated two contracts worth nearly \$275 million with the Federal Aviation Administration (FAA) to upgrade the air traffic control systems at airports across the country.

Under a contract extension worth \$185 million, Unisys Defense Systems' Electronic and Information Systems Group (EISG) Air Traffic Control/Air Defense group will carry out the next phase of the FAA's Automated Radar Terminal System (ARTS IIIA) Interim Support Plan (ISP). The FAA awarded the original \$45 million contract to Unisys in September 1989. Under the extended contract Unisys will deliver computer systems, peripheral systems, software development, and design engineering to expand the air traffic control systems at more than 60 major airports across the country. The modification extends the contract into 1995. Unisys will continue to deliver standard ARTS input/output processors required by the FAA, which are based upon noncommercial, special-purpose processors.

Unisys will manufacture additional equipment and provide design and project support, including the option of extra peripheral processors to support increases in airport tracking, aircraft identification capabilities, and an added Mode C Intruder detection system. Mode C detects and alerts controllers to the presence of all commercial aircraft in terminal areas.

Unisys' work is not directly related to IBM Corporation's Advanced Automation System (AAS) contract to upgrade the entire air traffic control system. Essentially, Unisys' efforts will keep the FAA system running smoothly until the AAS is completed. Unisys Defense Systems of McLean, Va., also negotiated an \$87.7 million contract with the FAA to upgrade the air traffic control systems at smaller airports across the country. Under the ARTS IIA ISP, the Unisys Defense Systems EISG will modify existing ARTS systems at 130 low- and medium-density airports across the country.

Beginning in 1987, when Kmart (Troy, MI) replaced MS-DOS with UNIX as the preferred in-store operating system, Kmart began buying Unisys hardware. The most recent contract signed in August 1991 provides 1,500 Unisys Intel 486-based U 6000/65 multiprocessor UNIX systems, along with open systems software, peripherals, and integration services to Kmart.



Kmart will install the U 6000/65 systems in the remaining 1,500 of its more than 2,300 stores in the U.S. (expected to grow to 2,500 stores by 1995). The U 6000/65 systems will supplement 1,000 486-based U 6000 Series computers previously ordered by Kmart, completing the Kmart Information Network II (KIN II) project.

KIN II allows Kmart to offer improved customer service and lower costs by providing store personnel with advanced information processing capabilities, including better product availability and inventory balancing, extended in-store inventory analysis, expedited cash handling, and labor management.

Kmart has just finished installing more than 3,000 Unisys U 6000 Series systems for the company's retail stores.

In June 1991, Unisys Government Systems Division won a \$612 million sole-source contract from the U.S. Air Force. The contract calls for Unisys to maintain and upgrade Air Force Phase IV base level computer support systems. Unisys ran unchallenged in the contract race, despite three attempts by the Air Force to find a competitor. The contract was perfectly timed for Unisys, which at the time was suffering financially. Unisys will replace existing 1100 models used in the original Phase IV program awarded to Sperry Corporation; Sperry and runner-up Burroughs have since merged to form Unisys. This win positions Unisys to be one of the beneficiaries of consolidation efforts under way within Department of Defense (DoD).

Many defense industry insiders believe that the Air Force's Phase IV program is one of the last large military contracts to call for continuation of the original contractor's proprietary approach. Future contracts will adhere to open compatible hardware and software standards.

On March 4, 1991, Unisys concluded an agreement to provide a range of hardware, software, and professional services to Martin Marietta in support of the \$526 million U.S. Department of Housing and Urban Development Integrated Information Processing Services (HUD HIIPS) contract. The contract was recently awarded to the Information Systems unit of Martin Marietta Electronics, Information & Missiles Group.

Under the contract, which has an initial value of \$42 million, Unisys will provide Martin Marietta with multiple 2200/600 high-end mainframe computers and U 6000 UNIX-based minicomputers. Unisys also will provide hardware maintenance and software support, as well as systems integration, consulting, and other professional services. The Unisys systems will be connected with an IBM-compatible mainframe and equipment from other vendors into an integrated network using FTS 2000

service to over 80 HUD sites. The integrated system will support a wide range of HUD applications, including the Federal Housing Administration (FHA) mortgage insurance program and other department financial and administrative programs.

On November 17, 1989, the Air Force awarded a five-year \$700 million microcomputer contract called "Desktop III" to Unisys. The contract was intended to provide up to 250,000 80386-based microcomputers to Defense Department offices. Actual shipments did not begin until April 1990. On September 9, 1992, the Air Force announced that Desktop IV was awarded to Zenith Data Systems. This \$740 million award will end the Desktop III efforts by Unisys. INPUT expects that protest activity will postpone the actual start of deliveries under Desktop IV. Desktop III was costly in terms of money and prestige to Unisys.

## 6. SI Organization

Unisys has been in the federal and commercial systems integration for more than 15 years. The company entered the SI market to support the sale of its computer hardware. Several core capabilities are required of vendors in this market. Unisys rates itself highest in project management skills and in technology expertise. It rates itself slightly lower in the ability to manage risk, vertical industry expertise, and client relationships.

Primary business objectives for SI vendors include increases in revenues and profits and responding to customer demands. Secondary business objectives include control of the account base, follow-on sales, follow-on facilities management contracts, and strengthened non-SI business based on reputation.

Systems integration within Unisys is housed in three separate organizations. Both the commercial and federal nondefense SI organizations operate on a matrixed basis. There is some blurring in the lines of demarcation between the different SI organizations. However, the division of responsibilities for conducting the SI business within each organization varies. Exhibit UNI-2 compares how major responsibilities are managed within the commercial and federal organizations respectively. A "C" indicates that the responsibility for the activity in question is primarily centralized, a "D" represents decentralized and a "B" indicates that the responsibility is both decentralized and centralized.



## EXHIBIT UNI-2

**Centralization/Decentralization of SI Business Function  
Unisys**

Responsibilities	Commercial	Federal
Strategy and long-range planning	C	C
Marketing and promotion	C	C
Account management/ sales	D	D
Contract review/approval	B	B
Project management/ control	D	B
Implementation/development	D	B
Hardware/software acquisition	D	B
Systems operations	C	C

C = Centralized, D = Decentralized, B = Both

Like most SI vendors with backgrounds in computer manufacturing and marketing, Unisys operates the business with a combination of dedicated and supplemental personnel. The dedicated staff focuses on activities such as strategy, marketing, legal support, contracts, and general administration of the business. In addition, the centralized organization usually houses specialized capabilities particularly applicable to systems integration efforts, such as project managers and technical experts. The supplemental staff may come from almost anywhere in the organization and are assigned on a project-by-project basis to support implementation. Unisys estimates that there are between 800 to 1,000 full-time commercial SI staff.

Unisys currently has its systems integration operations under three groups: Professional Services within U.S. Information Systems (USIS); Unisys Government Systems Inc. (Government Systems); and Paramax Systems Corporation (Paramax).

Professional Services concentrates on open systems consulting, networking, and imaging. This organization uses traditional SI skills to sell the commercial Unisys products. Unisys, in the fall of 1991, created Unisys Systems Integration Operations (SIO) to provide resources, skills, and technology needed by businesses to maximize the performance of their information technology systems. In addition to its own staff, SIO used personnel from Professional Services on SI engagements. Government Systems concentrates on federal systems integration and commercial outsourcing operations. This organization uses SI skills to sell commercial Unisys systems to federal customers. Paramax concentrates on federal business where the end user requires specialized hardware. Paramax uses SI skills to supplement these sales. Much of what Paramax considers systems integration is related to weapon systems, not information technology.

At one time Unisys had created a single organization for SI. Until January 1990, it offered SI services through its Complex Systems Organization (CSO). CSO handles integration projects such as Ontario Hydro and the National Association of Securities Dealers.

In January 1990, Unisys took steps towards linking the former Sperry and Burroughs products and services, including Systems Development Corporation (SDC), by replacing CSO with the streamlined Systems Management Group (SMG).

SMG was charged with performing the entire spectrum of systems integration services based on Unisys' and other vendors' hardware and software. Organizationally, SMG consisted of three divisions: Government SI, Commercial SI, and Support Services. The unit had 1,500 employees and was headquartered in McLean, Va. Unisys predicted that the 1,500-employee SMG would do \$100 million in 1990, with 90% of revenues coming from federal jobs and 10% from commercial integration contracts. A federal/commercial split of approximate 50/50 was forecasted by 1994.

In January 1991, Unisys disbanded its system integration unit, SMG, which was formed in the previous year. The company planned to continue offering systems integration, but the SMG organizations were folded back into Unisys. The Support Services Division went back to the Government Systems Division in McLean, Va., while the commercial side of the Systems Management Group was folded into the Customer Technical Services Group in Blue Bell, Pa.

While still in existence, on August 1, 1990, SMG's Systems Support Division received a \$20 million NASA contract from the Langley Research Center (LaRC) in Hampton, Va. The contract was for one year with 4 one-year options.

Under the terms of the contract, SMG assumes day-to-day operations of LaRC's computer systems, and is responsible for the integration of LaRC's IBM-compatible mainframes with departmental and personal computers.

As with most full-service vendors, a significant portion of total personnel committed to the SI business are in positions that directly support the implementation process. Exhibit UNI-3 gives additional detail on the staff supporting Unisys' SI commercial business.

EXHIBIT UNI-3

**Distribution of Commercial SI Personnel  
Unisys**

Capability	Percent
Management, strategy, planning, marketing	7
Legal/contract administration, finance	5
Project management and administration	10
Design/development/implementation	69
Hardware/software evaluation/acquisition	1
Hardware engineering	3
Sales	2
Other	3

INPUT estimate

Unisys will not reveal either its number of SI contracts or its average contract value. However, the company does estimate that contract values are increasing for both commercial and federal contracts.

As INPUT would expect from an established computer hardware manufacturer, 70% of Unisys' SI contracts include equipment. Packaged software is in 10% and professional services is in 20%. Likewise, 70% of their SI projects involve mainframe systems. If Unisys' open system strategy is successful, INPUT would expect this to change dramatically over the next few years.

## 7. SI Business Objectives

Unisys is now based on the following principles:

- First, it wants to be a company based on solutions. Its business is in applying information technology to solve information management problems.
- Second, it wants to focus on dynamic technologies for high-growth markets. New products meet growing needs in the market for on-line transaction processing, open systems, networking, software, and imaging.
- Third, it wants to build partnerships. New alliances have been formed with KPMG Peat Marwick and Coopers & Lybrand Deloitte for business consulting, and with Intel and Motorola for chip technology.
- Fourth, and most important, it wants to be recognized as company singularly dedicated to quality and customer satisfaction.

Paramax's strategy has five parts. The first is to maintain and support the company installed base. The second is to increase international revenues. The third is to identify new Defense areas. The fourth is to diversify into the civilian sector in areas such as air traffic control, weather radar systems, postal automation, and business data processing. The fifth is to maintain research and development of advanced technologies.

In addition, Unisys expects Paramax to increase its percentage of Unisys's total subsidiary sales from 35% to 50% by 1995 while decreasing the percentage of defense sales from 80% to less than 75%.

One example of Paramax's success in placing emphasis on commercial and civilian government projects is the \$43 million U.S. Postal Service contract for automated small package mail sorters, awarded in March 1992.

## 8. SI Capabilities Evaluation

Unisys has a broad base of capabilities which support the systems integration business. Exhibit UNI-4 summarizes Unisys' assessment of its strengths with regard to in-house capabilities for both the commercial and federal markets. In addition, the exhibit indicates those areas where alliances are routinely used.

EXHIBIT UNI-4

### Unisys' Assessment of SI Capabilities and Use of Alliances

Capability	Strength (High, Medium, Low)	Alliances (Yes/No)
Business consulting	High	Yes
Design methodology	High	No
Design/integration	High	No
Project management	High	No
Software development	High	Yes
Education/training/documentation	Medium	No
Packaged application software	Low	Yes
Packaged systems software	High	No
Standard computer hardware	High	Yes
Custom computer hardware	Medium	No
Communications hardware	High	Yes
Network management/operations	High	No
Service and repair	High	No
Software maintenance	Medium	No

INPUT believes that like most hardware vendors, Unisys is fully capable in the technical arena. The question is how the capabilities can be leveraged into the SI product offering and marketed convincingly to SI prospects.

## 9. SI Strategic Alliance

In March 1992, Unisys announced that it had joined the Open Software Foundation (OSF). Membership will give Unisys early and full access to OSF future technologies based on emerging industry standards. Prior to joining OSF, Unisys was an OSF licensee using OSF/MOTIF as the basis for the Primary Graphical Environment, the graphical user interface environment on the Unisys U 6000 Series of UNIX System V-based commercial servers. OSF/MOTIF was also the basis for the Graphic Administration system administration facilities in Unisys Open/OLTP transaction manager software for the distributed UNIX environment. OSF membership ensures full access to OSF software for evaluation, including OSF's recently announced Distributed Management Environment (DME) software.

The capability alliance with management consultant KPMG Peat Marwick helps customers analyze and plan their business. Using Unisys CASE/4GL software tools, KPMG and Unisys people build software applications for the Fortune 1000 marketplace. The packages help U.S. organizations work more efficiently in areas like financial management, human resources, and manufacturing. A key element in this alliance is the establishment of a technology resource clearance center near Atlanta. American Commercial Barge Lines, a major U.S. water transportation company, is just one customer that has contracted for these services.

Unisys also formed an alliance with Coopers & Lybrand Deloitte, the United Kingdom's largest management consultant. The alliance has already yielded a new product: Business Planning Workbench (BPW). BPW automates the methodology that Coopers & Lybrand uses worldwide to help customers plan strategies for their business and information systems. The overall process—from planning to solution delivery—happens more quickly because BPW works with their LINC CASE/4GL tool. The program is being piloted in the U.K.

These partnerships complement Unisys' own suite of professional services. Unisys skills help customers use information technology to achieve their business goals. They offer proven expertise in technology planning, custom software development, systems integration, outsourcing, and education. One of their newest wins is a \$45 million contract to manage computer operations for Subaru of America.

Unisys uses long-term alliances to support activities in vertical markets where they do not have a focus, in low margin areas, and for SI activities associated with business consulting.

Both the federal and commercial organizations utilize long-term and contract-by-contract strategies. Long-term relationships seem to be focused on OEM hardware and software. Short-term relationships are specific to a single SI program.

Unisys will incorporate any vendor's products as part of an SI proposal. The company's new strategy is to be customer driven and technology-based. It is becoming a consulting company to help customers apply technology. The approach is to analyze the customer's requirements and propose a Unisys-based solution where appropriate. In situations where a Unisys-based solution falls short, Unisys will propose solutions using other vendors' products or services. Exhibit UNI-4 summarizes Unisys' position on alliances.

On June 15, 1990, Unisys and Novell announced two agreements allowing Unisys to provide services to customers using the NetWare network operating system. Novell appointed Unisys an authorized NetWare Support Organization (NSO), able to provide both on-site and technical support to NetWare end users. Novell also appointed Unisys a Novell Authorized Education Center, permitting it to provide NetWare certification training to Unisys service technicians and engineers.

The move followed Unisys' April 30, 1990, announcement that it would offer comprehensive LAN services to customers through a service program called "Unisys Connect." NetWare is the initial focus of that program.

As an authorized NSO, Unisys supports NetWare customers around the clock. That assistance ranges from hot line support to on-site repairs for mission-critical applications. As an NSO, Unisys has electronic access to current technical information about Novell's products. Unisys' relationship with Novell dates back to 1982 when a predecessor company acquired the rights to resell the native NetWare system as UserNet. In the past, Unisys has released NetWare-derived products with value-added features after Novell released corresponding core products. The UserNet system is optimized for the Unisys Personal Workstation family. Support for SCSI disk drives is a key feature. The new Unisys strategy is to offer standard NetWare products to its customers, under the NetWare name where possible. That means that instead of producing customized UserNet products, Unisys will work with Novell to incorporate the features its customers need.

Based on Unisys' experience in networking, reservations systems, and federal government systems integration, INPUT believes there are considerable resident skills to perform a majority of likely commercial SI activities. For those activities that require outside resources, Unisys should have minimal difficulty in developing the necessary relationships.



## 10. SI Capabilities Summary

INPUT's overall evaluation of Unisys' capabilities is high. The primary weak spot appears to be in business consulting, and can be overcome by the judicious use of alliances and strengths from the various "lines of business" organizations supporting its traditional business. In addition to the general capabilities discussed above, Unisys has a number of unique capabilities that support entry into its desired market niches, including the following:

- Industry-specific software for finance, manufacturing, communications, and the public sector
- Connectivity products, including network processors, timeplexing systems, and software products to support systems network architecture (SNA), NET, and OSI
- Proprietary and alliance-provided network management products to support a variety of network architectures
- A substantial installed base

## 11. SI Marketing Strategy

Unisys has embarked on a line-of-business marketing strategy that it is leveraging into the commercial SI marketplace. In 1993, Unisys will implement a field education program designed to turn the hardware sales team into a solutions sales force. Unisys currently uses its field sales force to locate opportunities. In both the federal and commercial SI markets, Unisys responds to Request for Proposals (RFPs) and proactively develops prospects.

- Competitors: Unisys views as its competition primarily IBM, EDS, and Andersen Consulting. The latter primarily in the commercial market. CSC is also a key competitor in the federal environment. INPUT agrees with this assessment.
- Positioning: While there are variations between how the company presents itself to prospects and clients in the federal and commercial markets, there is a certain amount of consistency. Worldwide services and support, substantial resources, full-service supplier capabilities, and compatible product architecture are promoted by both the commercial and the federal organizations. In addition, the commercial organization emphasizes its vertical market expertise, and the federal, its experience in the federal marketplace.



- Promotion: Unisys deploys virtually all methods of sales promotion. Public seminars, direct mail, and advertising, both in general business publications and industry or trade publications, are used. However, like most other SI vendors, word of mouth and client referrals are the most effective ways of developing new prospects. It is interesting to note that in the commercial environment, Unisys has undertaken two avenues of promotion which it finds extremely effective "boardroom-level" seminars and the development and implementation of specific programs to educate and utilize outside consultants.

Unisys is primarily vertical or industry focused. The target industries are banking/finance, federal government, insurance, state/ local government, telecommunications, and airlines (transportation).

The federal SI business is generated by responding to RFPs. Fifty percent of the commercial SI business is developed from responding to RFPs, and 50% from leveraging existing clients. The company positions itself with prospects by showing the ability to accept risks, to focus strengths on key lines of business, and a proven track record as a hardware manufacturer. A summary of Unisys' marketing approach is contained in Exhibit UNI-5.

#### EXHIBIT UNI-5

### Unisys' Marketing Strategy

- Selling/prospecting through field sales—consultative sales
- Leverage federal government experience
- Vertical market focus for commercial marketplace
- Primary competitors: Andersen Consulting, IBM, EDS, CSC
- Positioning: full-service, full-solution
- Promotion: full-range, referral-effective

## 12. SI Customer Base

Unisys' commercial SI organization reports that it obtains about 80% of its contracts from the existing customer base. The remainder comes from new accounts, with increasing margins. Interestingly, the federal organization reports that all their current business is coming from existing

accounts, with stable margins. Both organizations, however, report they believe their businesses are profitable. Unisys expects the average annual growth of its commercial SI business to be 31%, and its federal to be 18%.

Unisys estimates that 50% of system integration revenues are generated by subcontracting to another SI vendor. Forty percent is generated by functioning as a prime contractor, with 10% coming from support to a SI project managed by a client.

Exhibit UNI-6 shows the relative margins realized from the various systems integration components.

## EXHIBIT UNI-6

**Systems Integration Components**

Integration Component	Relative Margins (H/M/L)
Standard hardware and software	H
Customized hardware and software	M
Software packages	M
Consulting/design/integration	H
Custom software development	L
Project management	M
Training and education	H
Post-installations operations	M

While Unisys is reluctant to discuss the specific number of contracts currently underway or accomplished over the past two years, the commercial organization did provide several examples of recent projects:

- While in existence, SMG drew on its experience in fulfilling a \$12.3 million contract it won with Grumman Data Systems to design a public safety information-management system for Suffolk County, N.Y. Unisys is providing and integrating 4 A-Series mainframes, 19 departmental systems running UNIX, 799 Personal Workstation microcomputers, and various communications equipment. Unisys is also responsible for customizing and supporting versions of its MAPPER fourth-generation language (4GL) and Standardized Tactical On-line Public Safety (STOPS) system.

- Paramax Defense Systems is one of three prime contractors on the Defense Advanced Research Projects Agency (DARPA) Software Technology for Adaptable Reliable Systems (STARS) program. The STARS program is intended to pave the way for DoD's migration to megaprogramming in software development. The concept of megaprogramming relies heavily on domain-specific software reuse as opposed to reuse at the code level. STARS will be demonstrated over the next two years.
- Kmart: Much of Kmart's success in recent years is attributed to its open systems computer strategy, which speeds customer service and helps keep store shelves stocked. Token-Ring networks and about 20,000 scanner registers are installed. Kmart also acquired lease capacity on a Sylvania Space-Net satellite. Kmart has recently introduced a second layer to its satellite communication system. The second layer performs instant credit authorization and runs on a Stratus XA 2000 fault-tolerant minicomputer.
- United HealthCare: To keep pace with the rapidly changing health care industry, United HealthCare needed a system that would enable the company and its clients to achieve maximum benefits from its large patient care data base. Moreover, it wanted to join with a strong computer systems partner in order to ensure an adequate system for the future. With Unisys providing program management and development expertise, United HealthCare is upgrading its current hardware and developing and implementing a new health care maintenance applications system.
- Frederick & Nelson: Purchased from Marshall Field and Company, Frederick & Nelson, a Northwest U.S. department store chain, needed to create a complete data processing facility from scratch, then migrate its current computer applications from Marshall Field's system to its new mainframe. Unisys' solution was a complete package, providing program management to combine hardware, custom software, customer services, facilities management, and operations management.
- NASDAQ (National Association of Securities Dealers Automated Quotations): Unisys' solution to providing an automated quotation system included its own Distribution Communications Processors, which linked the NASDAQ broker terminal network to the Unisys 1100 systems at NASDAQ's Connecticut facility via HYPERchannel products supplied by Network Systems Corporation. The resulting network opens the market to more investors and eliminates former limitations to trading.

During the upgrade of NASDAQ's network architecture, Unisys redesigned the network and developed custom software to allow the various mainframe systems and communications processors to communicate via the HYPERchannel network. Network redundancy to support disaster recovery was also supplied.

Additional SI projects undertaken by Unisys are summarized in Exhibit UNI-7.

EXHIBIT UNI-7

Unisys SI Projects	
Company	Project
Baxter Healthcare	System Integration
NASA JSC	Integration Services
HUD	Integrated information processing services
Texas Rehabilitation Commission	Automated disability examiner workstation
U-Haul	Integrated store management system

### 13. Summary and Future Directions

Although Unisys is a relative newcomer in the commercial SI arena, it has years of successful experience in the federal marketplace. It has considerable resources in-house to launch a successful attack on both markets and has organized to approach the market directly. As more commercial projects are completed, Unisys' portfolio of reference accounts should help it obtain a substantial footing in the marketplace. In addition, there is a commitment to the business that starts at the top of the organization. INPUT considers Unisys a solid competitor in the SI market.

In the SI market the company's products and capabilities position Unisys with a competitive edge over its competitors. Exhibit UNI-8 shows what technology and projects give Unisys an advantage.

## EXHIBIT UNI-8

**Unisys Technology and Projects**

Technology	Project Type
CASE/design methodology	LINC systems approach
Industry-specific software	Claims/documents processing
Connectivity products	SNA and UNIX (CAP SNA)
Hardware/software systems	Open systems across all product lines
Project management	Open systems rapid prototyping/Unisys systems development methodology
Data management	Semantic information model
Network management	Computer network management system

INPUT believes that Unisys will take a more aggressive posture over the next 12 to 18 months. Marketing has been significantly strengthened, and recent reorganizations are aligning commercial resources to mount significantly new promotional campaigns. Unisys will focus on network and other infrastructure opportunities as well as transaction processing in its lines of business.

INPUT believes that the success of the new SI and professional services focus within Unisys is tied inextricably to the success of Unisys as a computer company. 1992 has been a good year financially for Unisys, but debt is still a burden. During 1993, Unisys will continue to evolve. Unisys still depends on mainframe hardware even as the industry is being dominated by commodity-like desktop machines. Even with an open system strategy, this marketplace has lower profit margins than the traditional mainframe marketplace with proprietary operating systems.

As this report is being written, Unisys enters a year that INPUT feels could be pivotal to the company. If they continue to make a profit and restructure their U.S. field sales force at the same time, Unisys will be positioned to offer significant SI capabilities for transaction processing solutions in the lines of business (LoBs) and sub-LoBs they elect to pursue. They intend to emerge from their metamorphosis as a solutions

provider, rather than a computer hardware company. Paramax, a Unisys subsidiary, has established a more hardware-independent approach to offering SI services. They will need to undergo their own transformation as the federal government changes what it will buy from vendors.



## Comparative Vendor Analysis

SI vendors are making major adjustments in the 1990s. IBM, for example, has managed to do well in this period only in the service sector. Throughout its corporate structure, the firm is clearly attempting to reexamine its "sales and marketing roots." It is no coincidence that it has expanded its effort in the SI and outsourcing sectors.

For some firms, it has been a relatively straightforward process of minor adjustments to, or fine tuning of, their basic business plan. Others have realized for the first time that a business plan must include a significant marketing component that is considerably more than just an allocation of resources.

This same period has seen increasing customer demand for "full service." This in turn has increased the pressure on SI vendors to form additional alliances and/or engage in mergers and acquisitions that otherwise might not have taken place.

This full service trend has also legitimized the role of secondary SI vendors. Customers may be suspicious of "leading edge" technology, but the complexity of their applications all too frequently demands it. Secondary vendors, scorned just a few years ago by the SI community, have found a place in SI vendor proposals covering such technology "hot spots" as relational data bases, networking/connectivity, distributed systems, and client/server architecture.

The 1990s is a decade of challenge for SI vendors. It is likely to get harder before it gets easier. This section will discuss and compare how various SI vendors are dealing with these issues and how they are likely to fare in the future. Chapter IV discusses each vendor in depth.

Areas covered in Chapter IV include:

- Organization and financial characteristics
- Capabilities and products
- Strategies and markets

Two groups of profiles are referenced in Chapter IV. Exhibit V-1 defines by category the 33 vendor profiles done between 1990 and 1993.

---

**EXHIBIT V-1****Distribution of SI Vendor Interviews  
(All Profiles)**

- |    |  |
|----|--|
| 8  | Equipment manufacturers                  |
| 15 | Professional services companies          |
| 4  | Consulting-based                         |
| 3  | Systems operations/facilities management |
| 8  | DP professional services                 |
| 4  | Communications companies                 |
| 6  | Aerospace companies                      |

Exhibit V-2 defines by category the 15 profiles that were done in 1992. Each sample is referred to as necessary, depending on whether sample size and mix or currency will represent the better example.

---

**EXHIBIT V-2****Distribution of SI Vendor Interviews  
(1992 Profiles)**

- |   |  |
|---|--|
| 1 | Equipment manufacturers                  |
| 7 | Professional services companies          |
| 1 | Consulting-based                         |
| 1 | Systems operations/facilities management |
| 5 | DP professional services                 |
| 2 | Communications companies                 |
| 5 | Aerospace companies                      |

Additional profiles will be published throughout 1993 as part of INPUT's ongoing process of industry and vendor review.

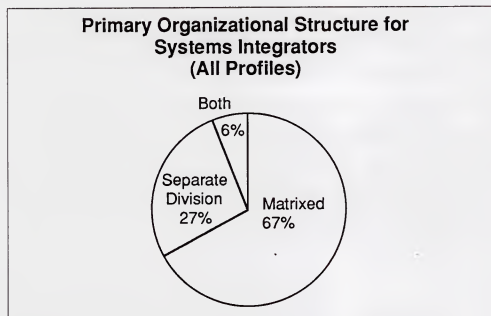


## A

**Organization and Resource Allocation****1. Organizational Structure**

SI vendors are basically organized into two dominant structures: separate divisions and matrixed organizations. One company indicated it had a separate subsidiary, but the parent company also performed SI functions using a matrixed organization. Two companies use both forms of organization. Exhibit V-3 shows the how the various companies are divided.

EXHIBIT V-3



The responses for 1992 did not significantly change the results from the prior report. Clearly, vendors favor a matrixed structure, presumably because it uses resources more efficiently and builds a closer business relationship with the client, especially when responsibility and resources are geographically close to the customer.

Specialized firms with highly specific technologies tend to lean toward separate operating divisions. Vendors concentrating in the federal marketplace also lean toward that structure, although even those appear to be adopting the matrix model of companies concentrating on the commercial sector.

The degree of centralization/decentralization in the eight major business functions of commercial and federal market participants changed little from the last report and confirms that the industry has settled down into a distinct operating pattern. Accordingly, Exhibit V-4 shows the responses of all surveyed vendors.

## EXHIBIT V-4

### Degree of Centralization of Business Function (All Profiles)

Responsibilities	Number of Respondents					
	Commercial			Federal		
	C	D	B	C	D	B
Contract review & approval	11	4	5	6	6	8
Management strategy & planning	12	3	7	8	3	9
Marketing & promotion	10	2	8	4	5	10
Hardware/software acquisition	7	5	7	6	6	8
Account management & control	4	11	5	2	15	3
Project management & control	4	13	3	2	15	3
Development & implementation	3	14	3	0	15	5
Systems operations	4	5	5	4	6	5

C = Centralized; D = Decentralized; B = Both

- Given the substantial financial risk accompanying most SI contracts, combined with the enormous investments involved in even a relatively small bidding process, top-level management activities such as strategy, planning, marketing, promotion, and contract review and approval tend to be centralized.
- Those functions involving day-to-day client contact and requiring fast, informed response tend to be decentralized. These include such areas as project management, implementation, and systems operations.
- Purchasing tends to be a centralized function, given the greater discounts available with volume.

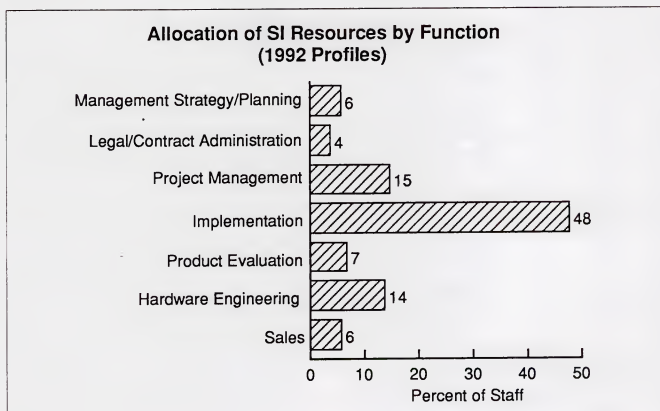
Given the geographic concentration of customers for federal vendors, combined with the larger average contract size and the more adversarial environment, there is a greater level of centralization of management strategy and planning, account management and sales, and contract review and approval. The greater concentration of the marketing and promotion function among commercial vendors reflects the significantly more diversified prospect base with which they must deal.

## 2. Allocation of Resources

Once again, the vendors reporting in 1992 reflect little change from 1990/1991. A higher concentration in hardware engineering and a decrease in sales resource allocation, shown in Exhibit V-5, are indicative of the communications and aerospace companies included in the 1992 survey. This is a predictable difference in project type between such vendors and those in the professional services sector.

The shift in implementation resources and project management noted in the 1990 and 1991 reports has remained absolutely stable, even among this slightly different mix of vendors. Vendors in all sectors are apparently continuing to accomplish their tasks more efficiently, as reflected in the implementation resource allocation (down from 57% in 1989). However, project management (up from 10%) continues to require greater resources, no doubt because of the greater complexity of the projects that are being managed.

EXHIBIT V-5



The trend forecast in INPUT's 1991 vendor analysis has, if anything, been accelerated by the new political and economic factors of the 1990s. SI activities will be conducted under the management direction of the information services organizations. Centralization of planning, marketing, and contract administration is inevitable if SI vendors are to maximize their resources in an increasingly competitive marketplace. Exhibit V-6 outlines INPUT projections.

---

EXHIBIT V-6

### Ongoing Organizational Structure Changes by SI Vendors

- Separate SI organization—division/subsidiary
- Matrixed organization structure
- Increased centralization of:
  - Management, marketing, contract administration
  - Specialized technical/vertical market expertise
- Increased decentralization of:
  - Account management
  - Project management

There will also be increased decentralization of account management, sales, and project execution. This is necessary for operating efficiency. A large, centralized organization simply can not respond quickly enough in these areas to be either customer-responsive or profitable.

IBM has begun decentralizing its sales force in 1992, allowing each group to concentrate on its own area of expertise with far more autonomy than they have ever experienced. Integrated Systems Solutions Corp. (ISSC), IBM's outsourcing arm, will be among the first to make the change, while at the same time working more closely with IBM's Technology Centers, thereby *centralizing* its SI and outsourcing functions.

---

B

## Financial Characteristics

### 1. Leading Competitors' Revenues and Revenue Sources

Of the top 5 vendors, IBM led the market in 1991 with strength in both the commercial and federal systems integration sectors, as illustrated in Exhibit V-7.

## EXHIBIT V-7

**U.S. Systems Integration  
Top Five Vendors and Primary Sources, 1991**

Vendor	Revenues (\$ Millions)	Primary Source <sup>(1)</sup>
1. IBM	1,750	B
2. Andersen Consulting <sup>(2,3)</sup>	787	C
3. EDS	770 <sup>(4)</sup>	B
4. Digital	565	C
5. Computer Sciences Corp. <sup>(3)</sup>	478	F

(1) F=Federal Government; C=Commercial; B=Both.

(2) Includes INPUT's estimate of equipment content

(3) Adjusted to calendar year 1991

(4) Non-GM business only

In 1991, IBM heightened its focus on the SI market with the formation of its Applications Systems line of business. By the end of 1992, it had shifted emphasis from its Technology Centers to ISSC, which had been formed in 1991, primarily to exploit outsourcing opportunities. IBM's Federal Sector Division continues to deliver FSI Services.

Andersen Consulting demonstrates the potential of the commercial market by assuming the number two position in the SI industry, based primarily on its revenues from the commercial sector. This was accomplished over a period of some three or four years.

For the 1991 market share ranking, INPUT has imputed additional equipment expenditures to Andersen Consulting. This represents equipment expenditures as part of an SI program, but not directly purchased by Andersen. Because of Andersen business and accounting practices, this is necessary to equitably compare user expenditures and market share.

EDS is a leading processing services/SI vendor, second in SI revenues to IBM in the federal sector and third overall. The firm also benefits from the manufacturing industry and telecommunications experience of its parent (GM). Strong program and risk management practices have made EDS an aggressive competitor.

Computer Sciences Corporation (CSC) made its SI mark in state and federal government, employing its extensive experience as a full service vendor. It is an ever more frequent competitor, with expanded commercial experience that it is beginning to increase via an aggressive acquisition program.

Digital has stepped up its ranking over the last several years, reaching the number five spot in 1991. Like Andersen, it demonstrates the potential of the commercial market sector, from which it derives some 90% of its SI revenues.

With half of the top ten vendors deriving their revenue primarily from the federal sector, combined with the significantly higher average contract size over those awarded on the commercial side, it is clear that a transition to commercial business in anticipation of decreasing expenditures and diminishing profitability will be neither quick nor without distractions and detours.

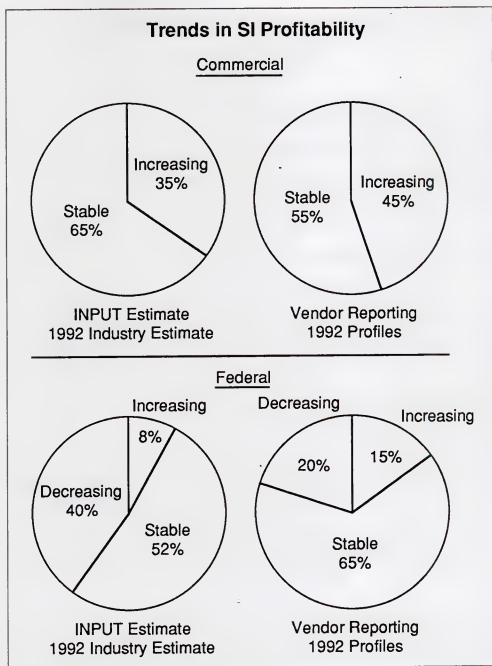
## 2. SI Profitability Factors

Profitability will force vendors to rethink their positions, however. As Exhibit V-8 reveals, it is increasingly difficult to generate profits in the federal sector, while profitability in the commercial sector is increasing. This continues the trend begun in the 1990s, forcing vendors to either adapt to the changed circumstances or seek new opportunities in those areas of the commercial sector where significant federal experience might provide a competitive edge.

The majority of survey respondents were unwilling to specify profitability levels. Even in discussing trends, INPUT believes that there is a reluctance to speak in anything but the most general terms. Hence, it was seen as necessary to draw conclusions from all of the data available and adjust survey results, based on several sources.

INPUT believes that, for the companies surveyed, the profitability of commercial SI was between 5% and 20%. In the federal sector, INPUT estimates profitability between 5% and 10%.

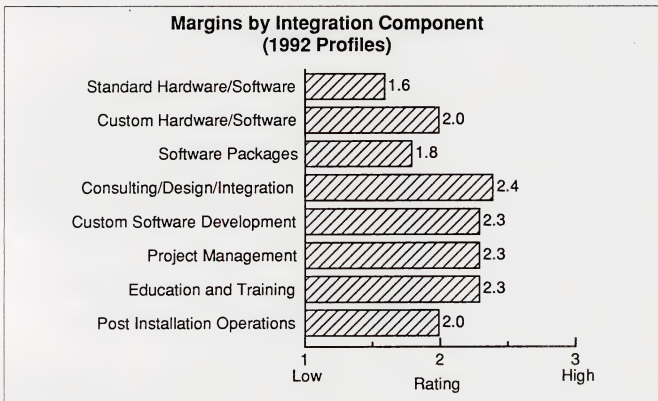
EXHIBIT V-8



Profitability by integration component however (Exhibit V-9), appears to have stabilized. Comparing responses in 1992 to those obtained in 1991 does not reveal significant differences, with the exception of the "Education and Training" category and "Post-installation Operations," which have shown increased margins.

In part, this may be due to the 1992 vendor sample. But in larger measure it is no doubt due to the greater attention paid to all areas of SI project management and risk assessment brought to bear in light of tighter profit margins.

EXHIBIT V-9



SI vendors can no longer take any area of a project for granted. Tighter project specifications and management controls are no doubt being seriously reviewed by virtually all SI vendors.

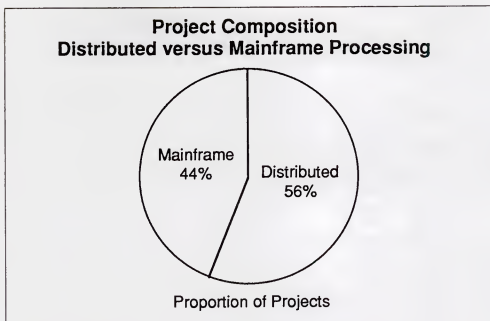
Standard hardware and software, on the other hand, continues to show a decline in profitability. This reflects the general trend in the computer industry.

### 3. Project Composition

Project composition has remained stable in 1992. As illustrated in Exhibit V-10, vendors report that 56% of their projects involved distributed systems (versus 58% in 1991) and 44% were mainframe-based (versus 42% in 1991). What was interesting to note in the 1992 survey was a tendency toward a greater commonality of responses, regardless of whether the vendor was based in professional services, hardware, telecommunications, or aerospace.



EXHIBIT V-10



Naturally, companies like NCR with its point-of-sale equipment, or AT&T with its UNIX and open systems advocacy, will exceed the 75% figure for distributed systems projects. But INPUT expects its 1993 surveys of the Big 6 firms will also reflect a greater involvement with distributed processing.

## C

### Capabilities and Products

#### 1. Overall Capabilities and Skills

In general, surveyed vendors appear to be responding to market pressures demanding that they be "full service" suppliers, if not in fact, then at least in appearance. Many vendors appeared reluctant in the 1992 survey to objectively define weak performance areas that they acknowledged in 1991. There was a distinct tendency to either rate a category on a high level or skip it completely. Consequently, this is an area where INPUT will be enhancing its tools in 1993 to measure buyer perceptions of vendor strengths, to provide telling comparisons and perspectives.

Exhibit V-11 presents a summary of vendor responses to the 1991 survey question concerning self-assessment of their capabilities. It continues to be indicative of the current situation, essentially serving as a reliable predictor of where most SI vendors are putting their internal development efforts, by class.

## EXHIBIT V-11

**Overall SI Capabilities by Vendor Class (1991)**

Capability or Skill	Equipment Manufacturers	Professional Services	Telecommunications	Aerospace Companies
Ability to manage risk	3	2	3	3
Project management skills	3	3	2	3
Technology expertise	3	2	2	2
Vertical industry expertise	2	3	2	3
Client relationships	2	3	2	3

Rating: 3=High, 2=Medium, 1=Low

In general, INPUT has observed the following:

- Aerospace and telecommunications firms appear to be the most varied and defensive in their public self-assessment tendencies. Aerospace firms, in particular, appear to be the least certain in terms of their marketing direction and consequently, the degree of disclosure they deem appropriate.
- Professional service firms have generally worked to improve their technical capabilities via internal hires, acquisitions, and alliances. With the exception of the largest of these firms, risk management continues to be a significant issue.
- Equipment manufacturers, increasingly eyeing the systems integration market both for its project management profitability and as a significant outlet for volume sales, have been attempting to develop more vertical industry knowledge and client relationship skills. While they certainly do so, in part, to better service their SI alliance partners, they are also interested in developing their own internal resources for primary vendor efforts.

The shifts in vendor emphasis shown in Exhibit V-12 are also revealing. Education, training, and documentation were perceived as an important issue in the 1991 survey. They represented important areas of customer concern, while at the same time posing a profitability problem for many vendors.

In 1992, SI vendors apparently resolved their internal problems in delivering such services profitably. INPUT noted a significant rise in this area and a continuing vendor interest.

Communications and networks have begun to be a more significant internal issue with vendors than in the past. SI vendors recognize the difficulties involved in acquiring internal network and communications management expertise and willingly work with the major carriers and other secondary suppliers. They are nonetheless concerned that such a major area of project focus be left totally in the hands of contractors. Hence, they appear to want to develop at least some internal measure of control.

EXHIBIT V-12

### Comparison of Capabilities Importance

Capability	1991 to 1992 Shift
Education/training/documentation	+
Standard computer hardware	-
Custom computer hardware	-
Communications hardware	+
Network management	+

Equipment vendors have developed strong alliances to augment dedicated in-house staffs and to add software packages and professional services (including business consulting). These moves allow them to offer a full range of support services. IBM, Digital, and Unisys are involved in such alliances. All three vendors have also added systems operations to their offerings and are using alliances to supplement internal SO resources.

Systems operations firms recognize SI as a vehicle for building systems for clients they can later convert into long-term systems operations contracts. Most systems operations firms have added professional services skills to expand their ability to add SI to their core business.

Communications firms are adding both software and professional services to expand network services into full-scale SI projects. AT&T, Cincinnati Bell, Bell South, Bell Atlantic, NYNEX, and Ameritech have made major investments in this strategy.

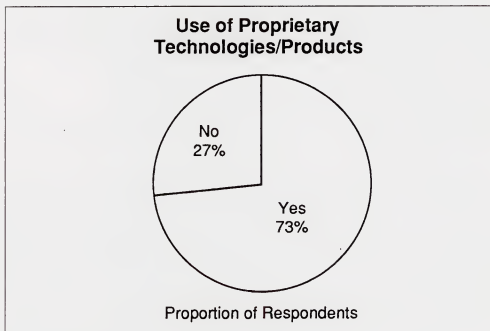
Aerospace firms are relying on their advanced technology capabilities to address unique government requirements. Attempts to enter the commercial markets have had mixed results.

Most vendors have recognized that they must participate in SI to protect their core business. How successful their entry into SI will be in expanding market share has yet to be seen. A real challenge to their traditional "culture" certainly suggests that there will be a great many failed efforts before a general pattern of success emerges.

## 2. Product Offerings/Technologies

Proprietary technologies continue to be an important factor for SI vendors. As illustrated in Exhibit V-13, 73% participating in the 1992 surveys continue to develop, and indeed promote, their proprietary technical capabilities. However, the nature of the technologies vendors favor is clearly directed by user/buyer demands for practical results: fast turn-around, modular "open systems" that respond to the demand for demonstrable results.

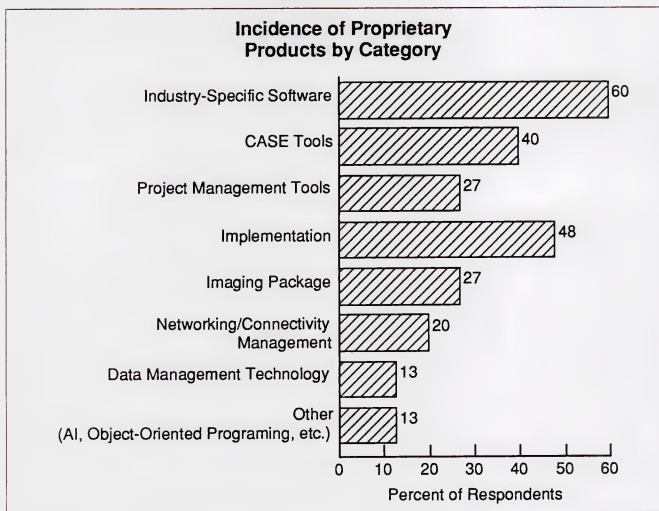
EXHIBIT V-13



The current economic climate and user/buyer mindset certainly does not arbitrarily endorse "leading edge" technology or technology for its own sake. The opposite is in fact the case.

The kind of proprietary technologies developed by vendors is illustrated in Exhibit V-14. There is little surprise that industry-specific software is the leading category. This responds to user/buyer demands to "show us first that it will work, then show us how you can adapt it to our specific requirements in a cost-effective manner."

EXHIBIT V-14



### 3. Secondary SI Vendors

Though INPUT sees the phenomenon of alliances between SI vendors as a marketing issue (covered in Section D), the marked rise in the use of "secondary SI vendors" over the past several years has been primarily driven by the rapid pace of technology and the increasing demands and expectations of user/buyers. In order to "fill in the gaps" in their product and service offerings, SI vendors have shown an increasing willingness to employ secondary vendors, to the degree that INPUT has begun methodically tracking them and assessing their emerging role in the marketplace.

The perceptions and limitations of secondary SI vendors is illustrated in Exhibit V-15. Though their interest level in the SI market is high, they do not want to (and indeed, cannot) assume the risks of prime contractor. Hence, they are perceived as a lesser competitive threat by the primary vendors, though their future alliance potential with other primary vendors is certainly not an overlooked factor.

EXHIBIT V-15

## Secondary SI Vendors

### Perceptions

- High interest level in SI—a new market
- Generally do not want to be prime contractor
- SI—a growing part of their business
- Know who major players are
- Want visibility to major players for specific capabilities

### Limitations

- Experience base often limited
- No large project management experience
- Narrow (highly specialized) technical skills
- Lack of financial resources
- If software or turnkey, restricted to own solution
- Geographically limited

In general, secondary vendors know who the major companies are and what industries are being addressed, as well as some of the key clients. They acknowledge the need for greater visibility and promotion of their capabilities, services and products. They seek long-term relationships with SI vendors and want to reach the position of being a permanent part of a vendor team.

Their lack of financial and/or geographic resources, combined with their frequently narrow speciality range, certainly eliminates them from consideration as a threat to SI vendors on a prime contractor level. However, the experience gained by a secondary vendor with a specific primary vendor may be used by another primary vendor in future competitive situations.

This is particularly true, given the inclination of many primary SI vendors to view secondary vendors as “disposable,” to be used on a specific project in a short-term context, then dropped for another vendor that bids a few percentage points less on the next project.

Other primary SI vendors recognize the shortsightedness of such practices. They have developed and continue to refine strong vendor support programs and make a point of fair secondary vendor treatment, as well as the maintenance of good relationships through continuing communication practices.

Exhibit V-16 presents the kinds of technologies that are driving the need for secondary vendors in the 1990s. As already mentioned, INPUT considers the emerging role of these vendors to be an important enough area to develop a separate report in the near future.

---

EXHIBIT V-16

### SI Technology Drivers—1990s

- Relational data bases
- Networking/connectivity
- Distributed systems
- Client/server architecture

---

## D

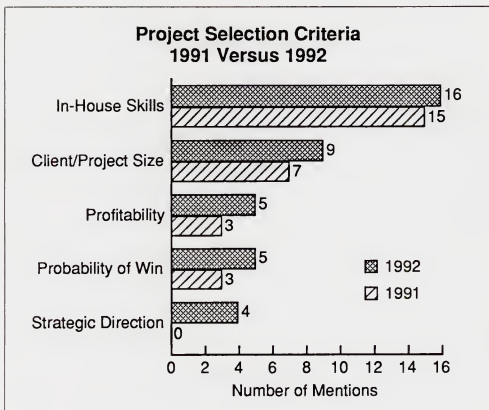
### Strategies and Markets

#### 1. Market Selection Criteria

The criteria on which vendors base their decisions to bid on a project have begun to make a marked shift in 1992. Exhibit V-17 shows a criterion not previously stated by vendors.

“Strategic direction” has made its appearance as a factor in bid selection for the first time in the history of the INPUT vendor survey. Though still not a dominant factor, its very mention is unique and clearly reflects a degree of market thinking not previously demonstrated by SI vendors.

EXHIBIT V-17



In-house skills and how they match against the requirements of a given project both continue to be the most important bid selection criterion stated by vendors in the 1992 survey (just as in the 1991 survey). But the days of simply matching skills against a host of potential projects are clearly at an end.

Further confirming this greater market awareness by SI vendors in 1992 are the target markets projected for the coming year(s). Whereas previous targeted markets reflected a match against in-house capabilities and skills, target markets in the 1992 match almost perfectly with INPUT's five-year market projections for leading segments (see Exhibit III-6).

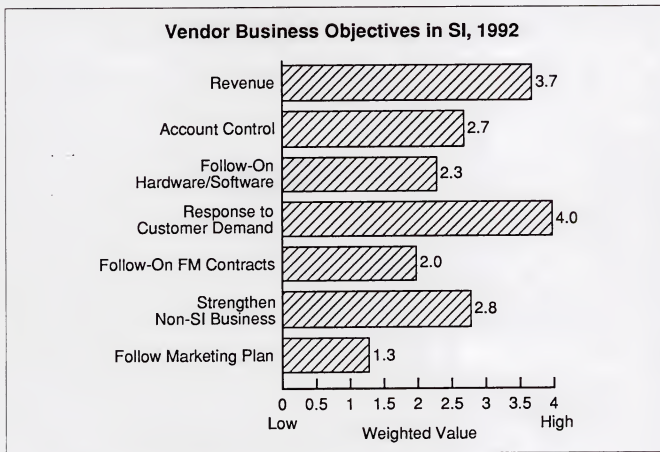
Clearly, SI vendors have realized that they will not be able to simply follow a sales plan based on current technical strength. They are beginning to realize that they will have to develop strength to satisfy the demands of the market.

"Profitability" and "probability of win" also received slightly greater consideration in the 1992 survey, which is also consistent with a greater marketing awareness. As vendors stretch their bid criteria, they will necessarily be more cautious in their review process. It is not that they are any more aware of the importance of these factors now, rather that they are less sure of their ability to capture new types of projects and, once won, less certain that they will manage them profitably.



Further reflecting this greater market awareness are the SI vendor business objectives illustrated in Exhibit V-18. While "revenue" is certainly heavily weighted as a primary objective for engaging in the systems integration market, the one factor cited by all vendors participating in the 1992 survey was "response to customer demand."

EXHIBIT V-18



As previously discussed, user/buyers are demanding a full-service, systems integration approach to problem solving. Industry suppliers are forced to respond if they wish to hold their clients and maintain their market position.

Also consistent with the new item appearing in the "project selection criteria" (Exhibit V-17) is the new objective making its appearance for the first time in the 1992 survey. "Following a marketing plan" without question represents a change of direction and a long-term statement of intent on the part of SI vendors. INPUT anticipates seeing this item increase in importance over the next few years, as the pressure on vendors continues to force them to respond to changing needs in the systems integration market.

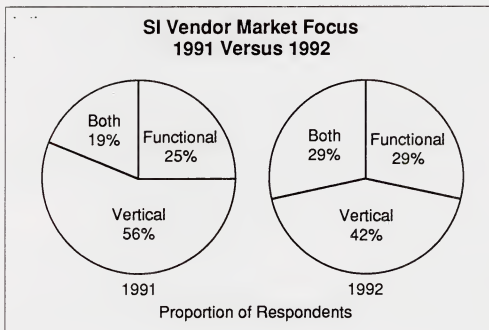
## 2. Market Focus

As previously stated, vendor target markets are consistent with INPUT's five-year market projections. Vendors have realistically chosen to follow the dollars.

How they choose to address those markets has also shifted a bit from prior years, with a slightly greater emphasis on "functional" rather than "vertical" market focus, perhaps reflecting (in part) their ongoing investment in technology, as well as their uncertainty as they enter new markets, combined with their lack of specific vertical market experience.

Exhibit V-19 compares SI vendor market focus in 1991 and 1992. A shift from a vertical market focus to a combined vertical/functional market focus is evident.

EXHIBIT V-19



While a part of that shift can be attributed to the significant number of aerospace firms included in the 1992 survey, the trend appears to cut across SI vendors by class. However, aerospace firms appear to be the most divided in their outlook and approach, reflecting the more difficult adjustment to changing market conditions for this class of vendor.

In general, vendors are attempting to realistically position themselves in the new marketplace. Exhibit V-20 illustrates the long-term objectives that most vendors have set for themselves. While emphasis will vary by class of vendor and even on an individual basis, the components of change now appear to be universal.

## EXHIBIT V-20

**Vendor Goals and Objectives**

- Long-term account relationship
- Decentralized services
- Full-service image and offerings
- Industry knowledge and skills
- Market coverage
- Proprietary products and methodologies
- Market participation

**3. Advertising and Promotion**

The overwhelming preference for "referrals" by SI vendors and their description of its effectiveness as an "advertising" method reflects the lag between vendor realization of a changing marketplace and a comfort level with the realities of those changes. Exhibit V-21 illustrates SI vendor experience with advertising and promotion and their preferences in descending order.

## EXHIBIT V-21

**SI Vendor Advertising/Promotion Preferences  
In Order of Preference/Effectiveness (1992)**Preferred Channels

- Referrals
- Trade Shows

Secondary Channels

- Trade Publication Advertising
- Direct Mail
- Consumer Publication Advertising
- Television Advertising
- Public Relations

It is not surprising that they perceive "referrals" as a primary promotion methodology despite the fact that it doesn't even belong in this category. Referrals are indeed a "gentlemanly" way of gaining an account introduction and was the preferred approach when buying was centralized among CIOs and data processing managers.

In the new market, where user/buyers dominate and project size is reduced and distributed among many industry sectors, SI vendors are going to have to realign their thinking and begin approaching the marketplace the way manufacturers have done it for decades.

Typical public relations practices such as news releases announcing contract wins or feature stories describing successful project accomplishments were not mentioned, other than by public relations departments in public companies, where the emphasis is on keeping up the price of their stock. No vendor referred to this common industrial practice in terms of promoting itself in the general market, though some do use it in fact.

"Trade Shows" represents the next most preferred promotional category, but was described generally as producing mixed results. SI vendor preference for this approach is understandable and not unlike their preference for referrals. Show management assumes the burden of attracting and delivering appropriate prospects, with the SI vendor assuming a relatively passive role.

Trade advertising requires audience definition by the SI vendor and aggressive follow-up. The mixed results described from this method may well reflect a mixed vendor ability to properly direct and monitor advertising performance and sales follow-up.

The least favored of the affordable advertising methods is direct mail, which is consistent with this analysis. Direct mail is an extremely focused advertising approach, requiring a clear definition of the target audience, the result desired, and the follow-up methodology to achieve it. The fact that SI vendors have not done well with direct mail is understandable in light of their uncertainties as to precisely the target audience they are seeking.

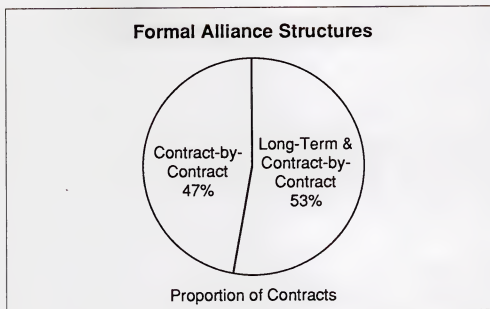
The expense and waste factors in consumer publication and television advertising render them beyond the means of all but the largest SI vendors. Even for those few that can and do advertise in these mediums, stock price is usually the issue rather than lead generation.

Advertising and promotion must and will become a more common practice among SI vendors as they become more proficient in their basic marketing practices.

#### **4. Vendor Marketing Alliances**

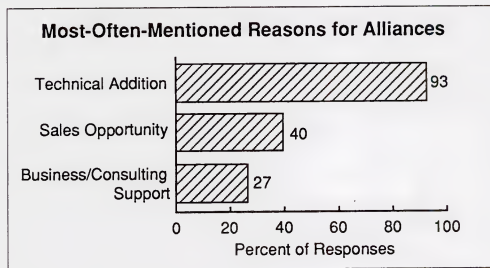
Though the subject of alliances was covered in the capabilities section of this analysis, additional comments are warranted in a marketing context. As illustrated in Exhibit V-22, only about half of the SI vendors engage in long-term alliances. This is essentially unchanged from 1991.

EXHIBIT V-22



Also basically unchanged are the reasons for such alliances, illustrated in Exhibit V-23, which present a reflection of market forces on SI vendors.

EXHIBIT V-23



The overwhelming reason for SI vendor alliances is clearly the need to present a full service image to prospects. For business-oriented vendors, this generally means adding technical capabilities via alliances. For vendors who previously focused exclusively on technical project components, this means adding a business capability.

Though "sales opportunity" represented a strong motivation for many SI vendors to form alliances, they meant precisely that: sales. This was an immediate, "target of opportunity" motivator. Although long-term alliances are still typically based on marketing considerations, few vendors engage in long-term relationships based on marketing considerations.

(Blank)



## Systems Integration Profile Questionnaire

INPUT publishes a report that includes profiles on the major systems integration vendors and summary information that identifies major trends in the SI market. The accompanying questionnaire has been developed to collect accurate data about your organization, so that we can develop an accurate profile of your company's systems integration business.

No profile information will be released without your review and approval. A copy of the draft profile will be provided for your review, comment and correction.

### PLEASE PROVIDE ANSWERS FOR YOUR U.S. DOMESTIC BUSINESS ONLY.

Please answer as many of the questions as possible, as we want to summarize the data as described above. Please identify any responses you do not want included in your company profile.

We appreciate your assistance with this research. In return for your assistance we will send you a summary of the data that is collected. To receive a copy, please provide your name and address below.

Name

---

---

Address

---

---

---

## SI VENDOR ANALYSIS QUESTIONNAIRE

## BACKGROUND/STRATEGY

1. How long has your company been in the systems integration (SI) business?
- \_\_\_\_\_ Years                      \_\_\_\_\_ Commercial?                      \_\_\_\_\_ Federal?
2. There are a variety of core capabilities/assets required to enter the SI market. Please rate (Scale of 1-5 with 5 being the highest) your evaluation of the company's capabilities/assets.

SKILL/CAPABILITY	RATING
------------------	--------

Ability to Manage Risk/Capacity	_____
Project Management Skills	_____
Technology Expertise/Depth	_____
Vertical Industry Expertise	_____
Client Relationships	_____
Other (specify): _____	_____

3. There are a variety of business objectives which can be achieved through participating in the SI marketplace. Please indicate with a P for Primary and an S for secondary, your firm's key motivators. Leave blank any objective which is not part of the strategy.

BUSINESS OBJECTIVE	P/S
--------------------	-----

Revenues/Profits from Systems Integration	_____
Control of Account Base	_____
Follow-on Hardware/Software Sales	_____
Response to Customer Demands	_____
Follow-On Facilities Management Contracts	_____
Strengthen Non-SI Business	_____
Other (specify): _____	_____

## SI ORGANIZATION/RESPONSIBILITIES

4. Which of the following organizational structures best describes the overall organization of the company's SI operations? (Check one)

Separate Subsidiary(ies)	_____
Independent Division(s)	_____
Matrixed	_____



5. If a separate division or subsidiary, please give the name and title of the top manager. If federal and commercial are separate activities, please provide the requested information for both.

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Division: \_\_\_\_\_

Address: \_\_\_\_\_

6. To whom (Name and Title) does the systems integration unit report?

Commercial \_\_\_\_\_

Federal \_\_\_\_\_

Both (If Appropriate) \_\_\_\_\_

7. Would you be willing to provide at least a two-level organization chart with names and titles for the SI organizations discussed above?  
(Y/N) \_\_\_\_\_

If yes, please include the organization chart with this questionnaire when you return it to INPUT.

8. Regardless of organizational structure, many of the responsibilities and activities required to manage and execute an SI contract are matrixed. Please complete the following table describing your organization's approach. Use C for activities which are primarily centralized in nature, D for those that are decentralized and B for both. Complete both the commercial (COM) and federal (FED) side of the table if appropriate.

(C=Centralized, D=Decentralized, B=Both)

RESPONSIBILITIES	COM	FED
Strategy and Long-Range Planning	_____	_____
Marketing and Promotion	_____	_____
Account Management/Sales	_____	_____
Contract Review/Approval	_____	_____
Project Management/Control	_____	_____
Implementation/Development	_____	_____
Hardware/Software Acquisition	_____	_____
Systems Operations (If Applicable)	_____	_____
Other (specify): _____	_____	_____

9. The next two questions request information regarding the number of personnel supporting domestic SI activities within the company. Since in most situations the number will vary with the active project load, estimates of averages would be more than adequate. In the event that the information is considered confidential, please provide a range of the population if possible.

\_\_\_\_\_ Full-time commercial SI staff  
\_\_\_\_\_ Average number of additional staff assigned to commercial SI  
\_\_\_\_\_ Full-time federal SI staff  
\_\_\_\_\_ Average number of additional staff assigned to federal SI

10. The following table describes several key staff capabilities required by both commercial and federal systems integrators. Please indicate the percentage of the total average staff (or \$ resources) associated with each category.

CAPABILITY	PERCENT
Management, Strategy, and Planning	_____
Legal Support/Contract Administration	_____
Project Management	_____
Systems Development/Implementation	_____
Hardware/Software Evaluation/Acquisition	_____
Hardware Engineering	_____
Sales	_____
Other (specify): _____	_____

#### CUSTOMER BASE

11. Approximately how many SI contracts have you completed or are in progress since the beginning of 1990?

\_\_\_\_\_ Commercial \_\_\_\_\_ Federal

12. What is the average contract value (1000s \$)

\_\_\_\_\_ Commercial \_\_\_\_\_ Federal

13. Are contract values increasing or decreasing?

\_\_\_\_\_ Commercial \_\_\_\_\_ Federal

14. What is the rough mix of products and services in your company's commercial and federal contracts? Please disregard profit, G&A, and overhead in calculating these percentages. (Total should add up to 100%.)

## PERCENT OF CONTRACT VALUE

	Commercial	Federal
Equipment	_____	_____
Packaged Software	_____	_____
Professional Services	_____	_____
Other (specify): _____	_____	_____

15. How are your SI projects distributed between mainframe-based systems and distributed systems?

Mainframe Systems

\_\_\_\_\_ %

Distributed Systems

\_\_\_\_\_ %

Other (specify): \_\_\_\_\_

\_\_\_\_\_ %

16. Would you be willing to name five or more SI customers and give a brief description of the projects undertaken?

---



---



---



---



---

## FINANCIAL CHARACTERISTICS

17. Please complete the following revenue table. If you cannot give actual numbers, please give a range.

Please Express Revenues in 1,000s Of Dollars

TYPE OF BUSINESS

FY 1990

FY 1991

Commercial Systems Integration

\_\_\_\_\_

\_\_\_\_\_

Federal Systems Integration

\_\_\_\_\_

\_\_\_\_\_

18. What do you estimate to be the average annual growth rate (AAGR) for industry SI revenues over the next 5 years?

\_\_\_\_\_ % Commercial

\_\_\_\_\_ % Federal

19. What percent of your current systems integration business comes from your current base as opposed to new accounts? Please feel free to estimate.

SOURCE OF BUSINESS	COM (%)	FED (%)
From Existing Client Base	_____	_____
New Accounts (Solicited for SI)	_____	_____
Other (specify): _____	_____	_____

20. Are margins (I) increasing, (D) decreasing, or (S) stable?

\_\_\_\_\_ Commercial      \_\_\_\_\_ Federal

21. What have been your recent before-tax profit (loss) margins on the systems integration business?

\_\_\_\_\_ % Commercial      \_\_\_\_\_ % Federal

22. Please identify the percentage of your systems integration revenues generated from each of the following sources:

#### PERCENT OF REVENUE

Prime systems integration contractor	_____
Subcontractors to another SI vendor	_____
Support to an SI project managed by client	_____
Other source of SI revenue (please identify)	_____

23. At what level are the relative margins your company realizes from the following systems integration components? Please indicate by using (H) for High, (M) for Medium and (L) for Low.

INTEGRATION COMPONENT	H/M/L
Standard Hardware and Software	_____
Customized Hardware and Software	_____
Software Packages	_____
Consulting/Design/Integration	_____
Custom Software Development	_____
Project Management	_____
Training and Education	_____
Post-Installation Operations	_____
Other (specify): _____	_____

## STRATEGY &amp; MARKETS

24. Are your systems integration market targets primarily vertical (industry-focused), or functionally (cross-industry) oriented?

\_\_\_\_\_ Vertical

\_\_\_\_\_ Functional

25. Please list primary target industries or functions.

---



---



---



---

26. What are your selection criteria for market targets?

---



---



---



---

27. How do you find prospects? What percent of your contracts are a result of:

## FEDERAL COMMERCIAL

Responding to Requests for Proposals

\_\_\_\_\_ %

\_\_\_\_\_ %

Proactively Leveraging Existing Clients

\_\_\_\_\_ %

\_\_\_\_\_ %

Other (describe): \_\_\_\_\_

\_\_\_\_\_ %

\_\_\_\_\_ %

Other (describe): \_\_\_\_\_

\_\_\_\_\_ %

\_\_\_\_\_ %

28. How does your company position itself with prospects regarding customer benefits, skills and capabilities, and competitive differentiation?

---



---



---



---

29. How do you promote your systems integration services? Please indicate in the first column whether you use the technique at all. In the second column indicate your assessment of the effectiveness of the technique using (H) for high, (M) for medium and (L) for low.

METHOD OF PROMOTION	USE (Y/N)	H/M/L
Public Seminars	_____	_____
Direct Mail	_____	_____
Advertising (General Business Pubs)	_____	_____
Advertising (Trade or Industry Pubs)	_____	_____
Advertising (Television)	_____	_____
Word of Mouth/Client Referrals	_____	_____
Other (specify) _____	_____	_____

30. Who do you consider your primary competitors in the systems integration business? Please fill in the following table.

COMMERCIAL	FEDERAL
_____	_____
_____	_____
_____	_____
_____	_____

### CAPABILITIES/PRODUCTS

31. The following table lists the primary capabilities required to deliver systems integration projects. Please indicate whether the capability exists in-house in the first column by answering yes or no (Y/N). In the second column indicate the strength of your company with regard to that capability by using (H/M/L) for high, medium or low. In the third column please indicate using (Y/N) whether you commonly use alliances (formal or informal), subcontractors, etc., to provide or supplement your in-house capabilities in a specific area.

CAPABILITY	EXISTS (Y/N)	VALUE (H/M/L)	ALLIANCE (Y/N)
Business Consulting	_____	_____	_____
Design Methodology	_____	_____	_____
Design/Integration	_____	_____	_____
Project Management	_____	_____	_____
Software Development	_____	_____	_____
Education/Training/ Documentation	_____	_____	_____
Packaged Applications Software	_____	_____	_____
Packaged Systems Software	_____	_____	_____
Standard Computer Hardware	_____	_____	_____
Custom Computer Hardware	_____	_____	_____

CAPABILITY	EXISTS (Y/N)	VALUE (H/M/L)	ALLIANCE (Y/N)
Communications Hardware	_____	_____	_____
Network Management/Operations,	_____	_____	_____
Service and Repair	_____	_____	_____
Software Maintenance	_____	_____	_____
Other (specify): _____	_____	_____	_____

32. Do you have a formal program with regard to alliances?  
\_\_\_\_\_ (Y/N)
33. Can you describe how you use alliances to support the company's systems integration business?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
34. Are alliances formed primarily on a contract-by-contract basis? Or are there formal, long-term agreements between your company and others which prespecify terms and conditions, etc.  
\_\_\_\_\_ Contract-by-Contract \_\_\_\_\_ Long-Term Agreements
35. If both types of agreements are used, please describe the circumstances under which each type of arrangement is invoked.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

36. Please identify the SI alliances your company has established and the major purpose of each alliance (for example, products or services provided by the other organization).

COMPANY

PURPOSE OF ALLIANCE

37. Are there particular proprietary technologies or products which you feel give you a leading edge in bidding systems integration projects?  
\_\_\_\_\_ (Y/N)

38. If you answered yes to Question 36, please indicate the products or capabilities, and the type of projects on which your company can gain leverage over the competition. (The following table lists several potential technologies; please feel free to use the proposed list and add additional entries.)

TECHNOLOGY

PROJECT TYPE

CASE/Design Methodology

Industry-Specific Software

Connectivity Products

Hardware/Software Systems

Project Management Processes

Data Management Products



## TECHNOLOGY

## PROJECT TYPE

Network Management Products

Other (describe):

Other (describe):

39. What specific trends in the user community do you feel are motivating the rapid growth rate of systems integration?

(Blank)